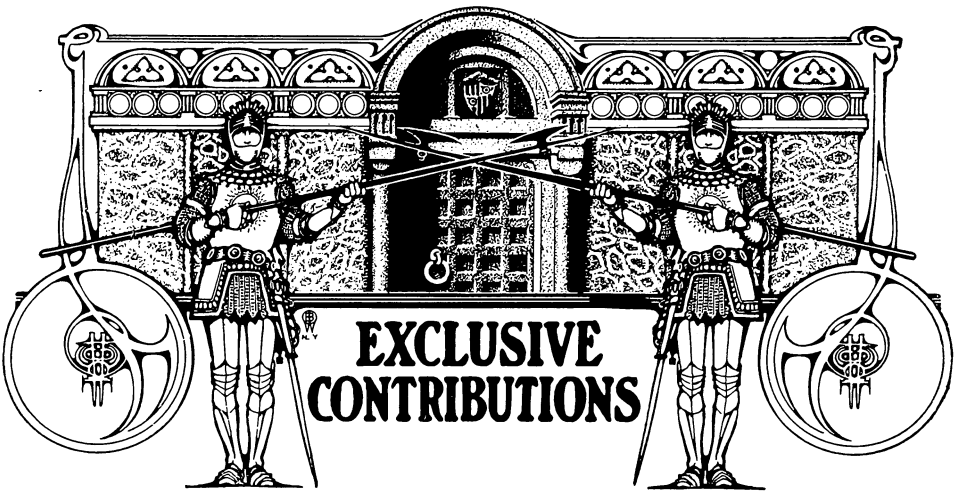


Local Anæsthesia of the Oral Cavity.

By Kurt H. Thoma, D.M.D., Boston, Mass.

We live in a time when the public demands the best and most thorough work done with the least amount of pain, and it is the duty of every dentist to study and make use of what chemistry and medicine offer.

Disregarding local anodynes, which, as we all know, are never very satisfactory, we have to consider general and local anæsthesia.

Among the general anæsthetics, nitrous oxide combined with oxygen is not only the best, but also the safest for our use, yet it is by far not an ideal one. If we use it for deep anæsthesia in extracting and oral surgery, the gag, as well as the blood and saliva that accumulate, obscures our field of operation. In operative dentistry in the analgesic stage one needs to have one eye on the nitrous-oxide machine and the other watching the patient. Interruptions caused by dizziness, vomiting, or passing into deep anæsthesia, may occur at any time. Therefore, this anæsthesia is not the ideal one which we are looking for and which we need when performing difficult operations, such as extirpations of pulps in multi-rooted teeth, opening up and cleaning out root canals in molars conscientiously. To do this properly it is necessary to concentrate one's whole attention on the work, and this cannot be accomplished under a general anæsthetic, where one has to be on the lookout for symptoms, stop working, wait for increase or decrease of the action of the gas, fear to be interrupted by bad effects, and hurry to get through before these set in and before the expense of the gas is too great.

The demand in minor surgery for performing operations without subjecting a patient to the dangers and discomforts of general anæsthesia brought about cocaine anæsthesia; but, on account of the idiosyncratic behavior of this drug, men of science looked for a substitute with the same action, but without toxic effect. This drug was produced by the Farbwerke Hoechst of Germany, and is commercially called novacain.

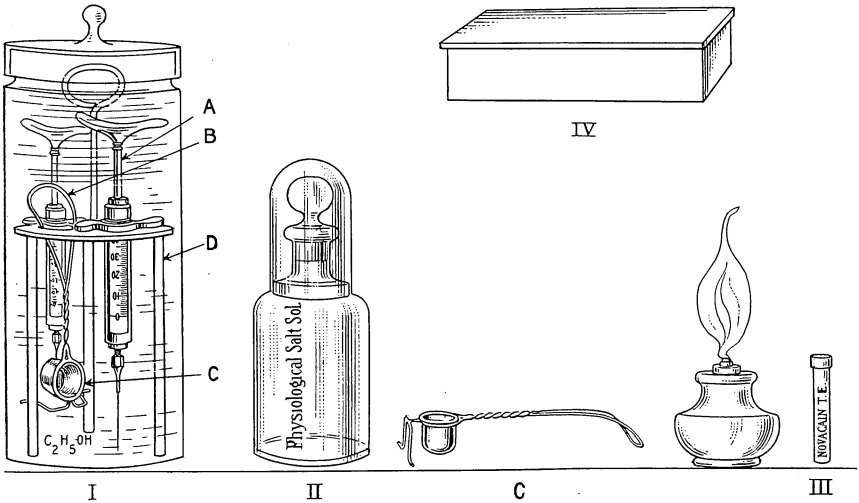


Fig. 1.—I. Glass jar filled with absolute alcohol. *A*, Syringe mounted with 42 mm. iridio-platinum needle; *B*, Syringe mounted with 26 mm. iridio-platinum needle; *C*, Silver cup with handle, later to be had in porcelain; *D*, Stand for syringes and cup. Draw alcohol into syringes when replacing them. II. Bottle for physiological salt solution. III. Novacain suprarenin tablets E (Farbwerke-Hoechst, New York). Cotton and cap should be replaced after use to prevent decomposition of tablets. IV. Glass tray with cover for tablets, needles, etc. The whole apparatus can be bought from Sampson-Soch Co., Boston.

Professor Braun, of Germany, the "Father of Local Anæsthesia," worked out laws for the technic and methods of the same, and now novacain, under aid of synthetic suprarenin, is used in Europe widely for minor surgery as well as for long surgical operations, such as ophthalmic goitre, an operation often lasting two hours and a half.

It is evident that, through local anæsthesia, we are able to do the most difficult operations in the mouth under the best conditions, in perfect calm, and can finish them without any haste or interruption. I will not spend much time on different theories of apparatus and methods to be used for injection, but just describe shortly my own, modified and worked out through experience in Harvard Dental School and private practice, with the aid of different books and papers of Professor Braun, Professor Fischer, Hauptmeyer, Schroeder, Seidel, and others of wide experience.

Apparatus. As apparatus Fig. 1, I use two Fischer syringes, one mounted in a short hub with a 26 mm., the other in a long hub with a 45 mm. iridio-platinum needle. I prefer iridio-platinum needles because it simplifies matters, in that they do not need to be boiled before use, can be used again, and therefore can always be mounted on the syringe ready for use. These do not break. If steel needles are used, which often show specks of rust and oxide, one has to boil them and should only use them once.

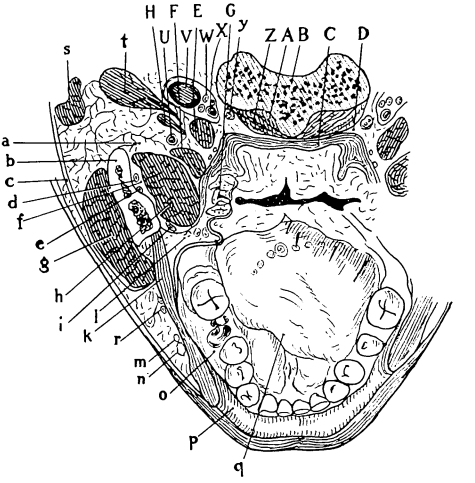


Fig. 2. Horizontal section through human head in the plane in which mandibular conductive anæsthesia is best accomplished. *a.* Glandula parotis; *b.* Ramus mandibulæ; *c.* Fascia parotideomasseterica; *d.* Nervus alveolaris inf.; *e.* A. and V. alveolaris inf.; *f.* Spatium pterygomandibulare; *g.* M. masseter; *h.* M. pterygoid int.; *i.* Nervus lingualis; *k.* M. buccinator; *l.* Glandulæ palatinæ; *m.* Art. maxillaris externa; *n.* Glandulæ buccalis; *o.* Gingiva; *p.* Labium inferius; *q.* Lingua; *r.* Glandulæ buccalis; *s.* M. masseter; *t.* M. Diagastricus; *u.* Art. carotis externa; *v.* Vena jugularis interna; *w.* N. vagus, glossopharyngeus and hypoglossus; *x.* Art. carotis interna; *y.* Ganglion cervicale superior; *z.* M. longus capitis.
A. M. rectus capitis anterior; *B.* Epistropheus; *C.* M. constrictor pharyngis superior; *D.* Fascia prævertebralis; *E.* M. stylopharyngeus; *F.* M. styloglossus; *G.* Tonsilla palatina; *H.* M. stylohyoideus.

One glass jar, filled with absolute alcohol, to contain syringes and silver cup (I).

One bottle double corked for physiological salt solution (II).

One silver cup, graduated, with handle, to measure and cook the solution, to dissolve the tablets and fill the syringe (*c*). This does away with measuring glass, test tubes and porcelain jar. This appliance can be had in porcelain in a very short time. These are much better than the ones of silver. One glass tray with cover to keep tablets and reserve needles (IV). Alcohol lamp and tube of novacain (III).

Drugs.

1st. Physiological salt solution. Professor Braun recommends to add a very small amount of dilute hydrochloric acid to offset the derogatory action of the glass alkali and to prevent oxidation of the suprarenin. His solution is:

℞ Sodii chloridi puriss..... 2.0
Acidi hydrochlorid. diluti..... gtt. i
Aquæ dest..... 300.0

I fill my bottle with this solution and boil it fifteen minutes.

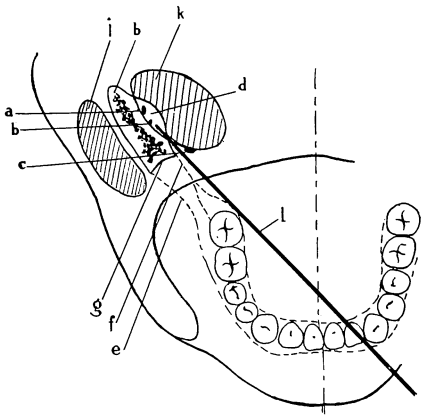


Fig. 3. Diagram showing position of needle in conductive anæsthesia of mandibula. *a.* N. alveolaris inf.; *b.* A. alveolaris inf.; *c.* N. lingualis; *d.* Spatium pterygo-mandibulare; *e.* Linea obl. externa; *f.* Linea obl. interna; *g.* Trigonium retromolare; *h.* Ramus mandibulæ; *i.* M. masseter; *k.* M. Pterygoid int.; *l.* Position of needle.

2d. Novacain. L. Suprarenin-synthetic-hyperdermic tablets E. are the most practical. They contain 0.02 gm. novacain and 0.00005 gm. L.-Suprarenin-synthetic and are sterile, in tubes of 20. Always replace cotton and cap of tube at once, otherwise the drug will be deteriorated from influence of air and moisture. If the solution is pink it probably is contaminated.

Novacain is, says Professor Braun, the best substitute for cocaine; no intoxication has been yet observed; it is as efficient as cocaine and has the advantage of remaining unchanged when boiled. Its maximum dose is 0.5 gm. in comparison to cocaine, which is 0.05 gm.

L. Suprarenin-synthetic is produced synthetically, and is much less toxic than the animal product, keeps better, and exceeds the latter in vasoconstricting and anæmia-producing power. Maximum doses (Fis-

cher), 10 drops equal 0.0003 gm. of 1 to 1,000 solution. It is added to prevent infiltration of the anæstheticum into the soft tissues and circulation of the blood.

Preparing of the Solution.

I take the silver cup and burn the alcohol out. Then fill it with physiological salt solution to the mark and boil this solution over the flame for a few minutes. Then I add the tablets and draw it through the flame till they are dissolved. The syringe then is filled from the cup

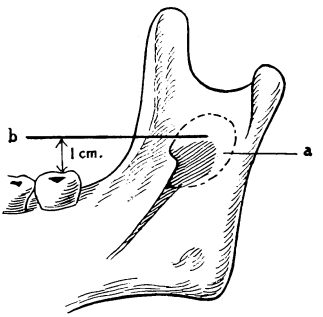


Fig. 4. Mesial side of mandibula. *a.* Sulcus mandibularis; *b.* Position of needle.

and the needle sterilized in the flame. The strength of the solution can be altered. If one uses one tablet to 1 c.c. physiological salt solution, one gets a two per cent. solution containing 0.00005 gm. suprarenin. If one uses two tablets to 2.5 c.c. one gets 1.6 per cent. novacain solution, containing 0.00004 gm. suprarenin. One tablet to 2 c.c. gives one per cent. solution with 0.000025 gm. suprarenin; 0.00003 gm. being equal to one normal drop.

Technic of Injection.

We distinguish: Intraosseous, infiltration and conductive anæsthesia.

Intraosseous Injections.

Intraosseous injections, as described by Drs. Otteson and Carrasquilla, I have abandoned, partly because a possible injury of the peridental membrane causes soreness of the tooth for a day or two, and especially because the conductive anæsthesia in the mandible is so practical and efficient that I do not need it. The method consists in drilling between two teeth through mucous membrane and outer wall of the alveolar process, inserting a needle of exactly the size of the drill and

injecting 1 to 2 c.c. of the solution into the cellular substance of the bone.

Infiltration Method.

This method depends upon diffusion of the solution through the pores of the bone, thus reaching the dental nerve before it enters the tooth. The number of pores is different over different teeth, and in the upper jaw different from the lower. Moreover, the density of the bone varies greatly in different individuals. Without exception this method can be used for any teeth in the upper jaw. The lower jaw is porous

Fig. 5. Infiltration method in the upper jaw. Photograph to show how syringe is held.

only in the mental fossa, while in the region of the back teeth the bone is very dense. But few pores are around the border of the alveolus. The infiltration method, therefore, is not advisable for the lower jaw, except for the four incisors.

Technic.

The technic consists first in spraying out the mouth with an antiseptic solution, such as phenol sodique; then hold the lip away from the gum, and with a short cotton roll wipe all the mucus from the field of operation. Then with a little bit of cotton dipped ln solution of iodine and aconite, equal parts, sterilize and anæsthetize the part where the needle is to be inserted. In very sensitive patients I use phenol on a very small piece of cotton applied on the well-dried mucous membrane. The point of inser-

tion is halfway between the gum margin and apex of the root. The needle, held like a writing pen, is pushed—opening directed toward the bone—down to the periosteum, and thence upward, just a little higher than the apex of the root. The injection must be made slowly and evenly, and, if correct, very little force is needed. In this manner we put the deposit of 1 to 1.5 c.c. of a 1.6 per cent. solution just over the apex of

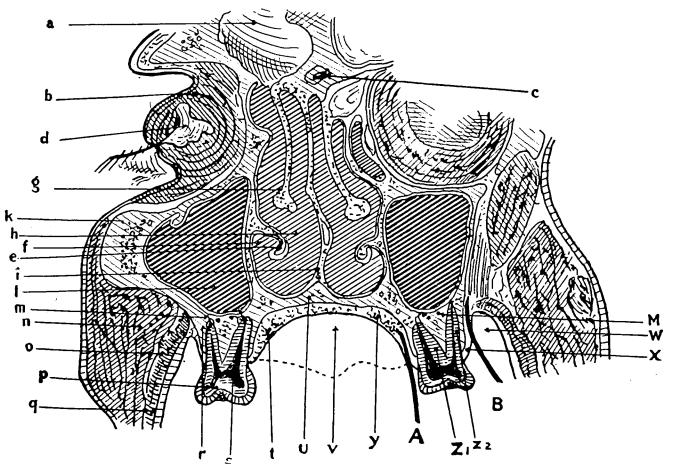


Fig. 6. Drawing from a frontal section through the sixth year molar region to show position of needle for palatal and buccal injection by the infiltration method. *A*. Position of needle for palatal injection; *B*. Position of needle for buccal or labial injection.
a. Sinus frontalis; *b*. M. orbicularis oris; *c*. Cellula ethmoidalis; *d*. Bulbus oculi; *e*. Concha nasalis inf.; *f*. Meatus nasi inferior; *g*. Concha nasalis media; *h*. Meatus nasi medius; *i*. Septum nasi; *k*. Processus zygomaticus; *l*. Sinus maxillaris; *m*. Plexus dentalis superior; *n*. M. masseter; *o*. M. buccinator; *p*. Dens molaris primus; *q*. Membrana mucosa buccalis; *r*. Processus alveolaris; *s*. Pulpa dentis; *t*. Membrana mucosa palatinæ; *u*. Processus palatinus; *v*. Cavum oris; *w*. Cavum buccalis; *x*. Membrana mucosa alveolaris; *y*. Glandulæ palatinæ; *z*. (1) Radix palatinæ; *z*. (2) Radix buccalis.

the root, between mucous membrane and bone. The tissue should not turn white and the velum is hardly noticed, because the deposit of the solution is higher than the mucous fold of the cheek. At the palatal side we insert the needle nearer the gingival margin, push it down parallel with the root and inject 0.25 c.c. of the solution. The anæsthesia takes place in from five to eight minutes. Massage of the part will help quicken the process. The anæsthesia lasts for one hour, and any dental or surgical operation can be performed on this tooth.

Conductive Method.

Here the conductivity of the main trunk of the nerve supplying the teeth and tissues in the oral cavity is intercepted or blocked at a convenient point, while in mucous anæsthesia the drug acts on the peripheral nerve endings. For solution I use two per cent. in accordance

with Lieb's law, so that the concentration of the solution necessary to anæsthetize a nerve should be proportional with its calibre. I use conductive anæsthesia entirely in the mandible, but also in case of extensive work in the maxilla. It is especially commendable when the mucous membrane is inflamed, spongy, or in any other pathological condition. In regard to location, I divide it into two classes:

First, anæsthesia of the mandible. Second, anæsthesia of the maxilla.

In regard to the operation:

A. For dental operations. B. For surgical operations.

A includes extirpation of nerves, grinding, and excavating of cavities. B, extraction of teeth and operations for cysts, tumors, necroses, etc.

Anæsthesia of the Mandible.

A. For Dental Operations.

For dental operations we need only anæsthesia of the inferior alveolar nerve which supplies the teeth. It enters the mandible through the mandibular foramen. For anæsthesia of the molars and bicuspids on one side, one injection over the mandibular foramen into the pterygo-mandibular space (Fig. 2, *f*) is sufficient. For anæsthesia of molars, bicuspids and incisors a second injection into the mental foramen of the opposite side is necessary on account of the anastomosing of the two nerves in the incisor regions. For anæsthesia of all the lower teeth, one should use two injections, one over each of the mandibular foramina.

B. For Surgical Operations.

For surgical operations we not only need anæsthesia of the teeth, but also of the soft tissue surrounding them. On the inner side this region is supplied by the lingual nerve, on the buccal side by the alveolar nerve, and by the buccinator nerve in the region of the first and second molar and second bicuspid. Therefore, we need anæsthesia of the lingual and buccinator nerve in addition to the alveolar.

Technic: Mandibular Injection.

Palpate the postmolar triangle with tip of index finger on the left, with the tip of the thumb on the right side, with the other finger fixing the jaw. Prepare place of insertion as described above, place syringe (mounted with 42 mm. needle) between cuspid and first bicuspid of opposite side and insert it in the mucous membrance 1 cm. over the last molar and try to feel with the needle the internal oblique line. Then slide it a little more medially and push it forward, keeping in close contact with the ramus. This may necessitate a different direction of the syringe according to the angle of the ramus to the median line which varies

Fig. 7. Photograph to show position of thumb and fixation of jaw for conductive anæsthesia of right inf. alveolar nerve.

(Fig. 3). After the insertion of the needle inject a small quantity. Now comes the distinction for dental and surgical anæsthesia. The lingual nerve (Fig. 2) lies anterior and medially of the alveolar nerve, halfway between the alveolar nerve and the mucuous membrane. Therefore, by

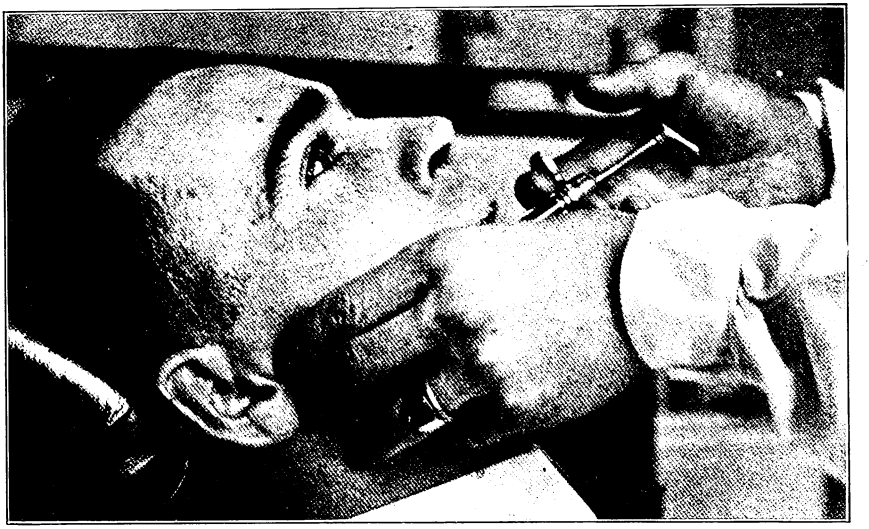


Fig. 8. Conductive anæsthesia of right inf. alveolar nerve. Fingers of left hand fix the jaw.

depositing one-third of the solution when the needle is halfway in, we will anæsthetize the lingual nerve, the rest being deposited into the pterygo-mandibular space, in which the alveolar nerve and vessels lie, or when

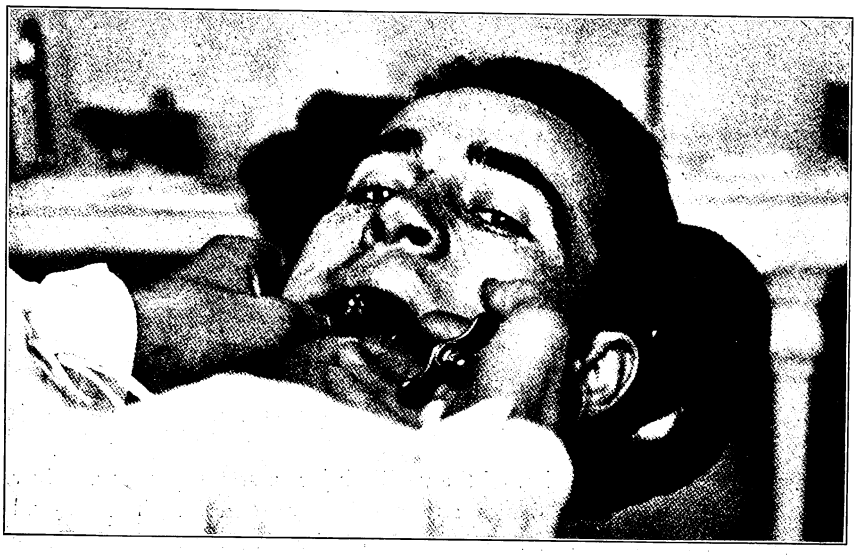


Fig. 9. Conductive anæsthesia of right inf. alveolar nerve. Tip of thumb lies in the post-molar triangle.

the needle is inserted to its full extent. The pterygomandibular space is bounded externally by the sulcus mandibularis (Fig. 4), internally by the int. pterygoid muscle. It is filled with connective tissue. For this injection I use 2 c.c. If we want anæsthesia of the alveolar nerve only, we do not inject until the needle is inserted to its full extent, so avoiding anæsthesia of the lingual nerve, depositing 1.5 c.c. at the alveolar nerve. Anæsthesia occurs in from fifteen to twenty minutes.

Mental Injection. For the injection into the mental foramen we insert the needle into the reflexion of the mucous membrane, below the first bicuspid, pushing down and slightly back along the bone for several millimetres and depositing 1 c.c., massaging it after the injection.

Buccinator Injection. For the buccinator nerve, one injection either directly into the mucous membrane supplied by it, or, in case of inflammation, by conductive anæsthesia. inserting the needle just below Stenson's duct.

Anæsthesia of the Maxilla.

The neurology of the maxilla is more complicated. In the sphenomaxillary fissure the maxillary nerve divides into posterior palatal and infraorbital; the first enters the palatine canal and comes out through the larger palatine foramen, supplying the posterior part of the palate and the palatal part of the gum. The infraorbital nerve gives off two posterior alveolar branches, supplying the buccal part of the gum and the upper

Fig. 10. Photograph to show position of index finger and fixation of jaw for conductive anæsthesia of left inf. alveolar nerve.

molars. The infraorbital proper passes along, giving off branches through the infraorbital foramen, supplying the outside of face and labial part of gum; the rest passes downward along the antrum, forming a plexus supplying bicuspids and incisors. The anterior superior alveolar branch emerges from the incisive foramen and supplies the anterior part of the palate and the palatal part of the gum.

A. For Dental Operations.

The infiltration method is entirely sufficient for dental operations in the upper jaw, but should anæsthesia of all three molars be desired, the post-molar injection can be used. The technique consists

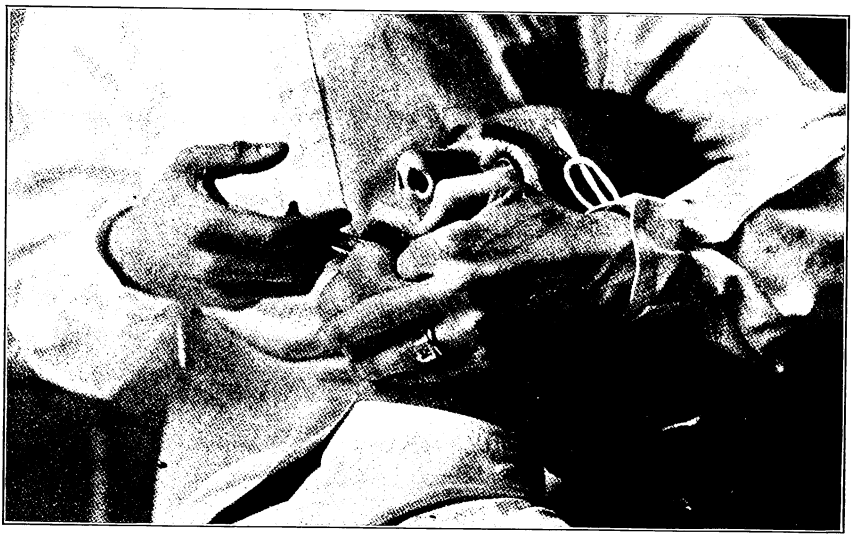


Fig. 11. Conductive anæsthesia of left inf. alveolar nerve. Fingers of left hand fix the jaw.

Fig. 12. Conductive anæsthesia of left inf. alveolar nerve. Tip of index finger lies in the post-molar triangle.

in palpating the zygomatic process of the maxilla, preparing the place of insertion as above and sliding the long needle upward, backward and inward, depositing the solution while injecting. Use 1.5 c.c. of the two per cent. solution. After ten minutes anæsthesia is obtained.

B. For Surgical Operations.

Here also the infiltration method is sufficient for many cases, but for more extensive work we can use postmolar injection, in combination with palatine injection, to get anæsthesia of the posterior palatal part of the gum. The palatine injection consists of injecting 0.3 c.c. into the palatine foramen. The needle is inserted over the inferior part of the third molar (in children, over the last molar present), working slightly upward and backward. More than 0.3 c.c. solution causes anæsthesia of the soft palate and is undesirable.

Anæsthesia of the Whole Upper Jaw.

For this we may reach the infraorbital nerve in the spheno-maxillary fissure. We may use two infraorbital together with two postmolar and two palatine injections. A sure method for surgical operation requires eight injections.

One postmolar injection on either side, 3 c.c.

One palatine injection on either side, 0.5 c.c.

One injection into the reflexion of the mucous membrane, between the two upper bicuspids on either side, 2 c.c.

One labial injection into the reflexion of the mucous membrane over the central incisors, 1 c.c.

One incisor injection into the incisive foramen, 0.5 c.c.

Using in the whole 6 c.c., or three syringefuls of a 1.6 per cent. solution. This gives total doses of 0.096 gm. of novacain (maximum doses, 0.500 and 0.00024 gm. suprarenin, maximum doses 0.00030 gm.).

Failures in Local Anæsthesia.

We meet with failure in local anæsthesia of various kinds:

I. As to Effect.

II. Undesirable Symptoms During Anæsthesia.

III. After Effects.

Failures as to Effect.

Failures, in effect, arise from:

1. Insufficient knowledge of the anatomy of the oral cavity.

2. Inefficient apparatus and technique.

3. Inefficient drugs or drugs deteriorated through age, chemical or bacteriological influences. As to drugs, I can recommend highly the preparation made by Farwerke Hoechst. Their E-tablets, containing both novacain and synthetic L-suprarenin, are of best quality, fresh, and come sterile in glass tubes. For saparate use take the novacain tablets D and the L-suprarenin synthetic tablets, those being also highly commendable. Adrenalin solution is usually of unknown age, and as an animal product not so pure and much more easily decomposed than suprarenin.

Undesirable Symptoms During Anæsthesia.

There are two kinds: 1st, local symptoms; 2d, general symptoms.

1. Local symptoms are difficulty in deglutition and pain. The former comes from improper technique, the latter may come from the following:

(*a*) From injecting a too cold or too hot solution. The solution ought to be of blood temperature. This can be easily obtained by my described method, where the solution is specially prepared every time before use.

(*b*) From drugs added to the solution to keep the solution sterile. Seidel found in applying the velum test on the cutis of the arm that thymol added to the solution produces in some cases severe pain.

(*c*) From the solution not being isotonic with the blood, too high or too low a percentage of salt causes osmotic pressure.

2d. General Symptoms.

The pulse rate may be increased, sweating may occur, or trembling of the extremities, as well as severe symptoms of intoxication. These have been observed by Frohman, and I also had one case of what at first looked exactly like cocaine poisoning. Just after insertion of the needle and injection of only 0.2 c.c. of a two per cent. solution, the patient's lips became blue and fainting followed. I at once tipped the patient back and started to excavate the very sensitive cavity; pain immediately brought the consciousness back. The pulse was increased and respiration forced; cold sweating and muscular pains, especially in the limbs, lasted for two hours. I gave brandy, and later hot coffee. I credit the cause to the adrenalin; I had it in my office two weeks and it showed the slightest discoloration. Since I stopped using adrenalin I have observed no more symptoms of intoxication, while before, several patients complained of their heart going faster. Dr. Frohman's experience was somewhat similar; he succeeded, however, in extracting one wisdom tooth, and when the patient came back (after two weeks) for extraction of the other wisdom tooth he hesitated to give an anæsthetic. He used the ethyl-chloride spray for a very

short time, and at once the same symptoms appeared. This is a good example of what fright can do.

Bending the patient forward, head between knees, potassium bromide, or valyl, highly recommended by Professor Dr. Kionka, in Breslau, helps in these cases. The latter is valuable in cases of increased pulse, heart action and trembling. It also can be given as a preventive, one-quarter to one-half hour before the operation, to counteract fear.

After Effects.

After effects are: 1. Œdema. 2. Pain, being divided: A. Originated from wounds. B. Originated from injection.

1. Œdema.

This is a simple swelling caused by infiltration of serum. It may be caused:

(*a*) By solutions that are not isotonic.

(*b*) By traumatism, caused by inserting the needle several times in the same part, correcting the direction. In conductive anæsthesia, by piercing the inerior pterygoid muscle or injecting itno the same. This also may cause ankylosis of the mandibule and difficult deglutition.

(*c*) By a peculiar and sensitive protoplasm.

2. Pain.

If we treat the subject of pain after an anæsthetic, we have to consider that it very frequently occurs after operation:

(*a*) From a septic wound.

(*b*) From an aseptic wound, infected by the oral fluid.

Therefore, it may *not* be caused by the injection. To avoid this pain after operation, infected tooth sockets should be curetted and washed out with an antiseptic solution. A dressing with novacain powder will be found beneficial; still better is Tribel's:

℞ Chlorali hydrati 2.0
Camphoræ 1.0
Novacainæ 0.5
Misce exactissime.

Pains Originating from Injection.

These can really be ascertained only after a purely dental operation where no tissue other than the tooth is injured. Most authors agree that it very rarely occurs unless caused:

(*a*) By deteriorated drugs;

(*b*) By injury of the cells through osmotic pressure;

(*c*) By infection with a non-sterile solution, syringe, or needle;

(*d*) By bacteria taken up and carried into the tissue from the mucous membrane of the oral fluid.

To counteract pain from either cause we may administer internally:

℞ Aspirin ..... 0.3 gm.
D. S.: At once, one after one hour.

℞ Pyramidon ..... 0.3 gm.
D. S.: One at once, one after one hour if needed.

℞ Trigemin ..... 0.25 gm.
Add capsules gelatine No. X.

D. S.: Two to three capsules one to two times daily as required.

Trigemin is especially commendable for trigeminal neuralgia and for all toothaches.

Before closing my paper I want to call your attention to another use of local anæsthesia, and this is for *diagnosis* of cases of obscure pulpitis and neuralgia. If you suspect a tooth, you need but anæsthetize it by the infiltration method. If your diagnosis was correct, the pain will stop.

Once more I want to heartily recommend local anæsthesia for dental and surgical operations in the oral cavity, as well as for diagnosis. I use it continually in my office with unchanging success, and with the Hoechst tablets I have observed no more after-effects. My patients are very enthusiastic about it, and that all will be so soon is my sincere wish.

Nitrous Oxid.*

A Compilation by H. E. Tompkins, D.D.S.

The Rev. Joseph Priestley (he was a minister, you know, who worshipped at the shrine of things material, particularly things chemical), as well as being the father of his flock seems to have been the father of many other things. Chemical history is dotted with the mention of his name as the discoverer of gases of various kinds, among them being "dephlogisticated nitrous air" or, as we know it, nitrous oxid.

Priestley, too, has the honor of having been the first to separate oxygen from the air and to prove it to be a constituent thereof. He,

*Copyright by H. E. Tompkins, 1913.

though, was not the discoverer of this gas, for it seems to have been known as a gas or substance by the early Greeks and Chinese. Chemical history of the B. C. period is chaotic but it is thought that the Babylonians and Chaldeans were acquainted with the gas, also.

Priestley's Discovery of Nitrous Oxid.

It was in the period of from 1768 to 1772 that Priestley first discovered nitrous oxid. He had been experimenting with nitrogen and its oxids and had already isolated nitrogen dioxid or nitric oxid. One day while working with this gas, or "air," as he called it, he had some moist iron filings in the retort. He noticed that a gas was being evolved which was entirely new to him and which he called "dephlogisticated nitrous air." Later experiments proved his process, which is now known as the production of nitrous oxid by reducing nitric oxid. The method consists, to-day, of the same general procedure as that employed by Priestley. It has been proven by Gay-Lussac in 1816, Schiff in 1862, Kohlmoun in 1874, and Gray in 1879 that the nitric oxid may be reduced by hydrogen sulphide or various other sulphides, zinc, iron, sulphate, sulphur dioxid, sulphites, tin chloride, or ammonia.

This method, while it is more or less accurate in producing a comparatively pure gas, is not sufficiently economical to be used in the commercial production of nitrous oxid.

Priestley's next discovery was in 1776 when he reduced nitric acid by some of the metals and evolved nitrous oxid. It has been shown in later years that the gas may be evolved by the reduction of nitric acid in the presence of water by copper, zinc, tin or iron; or by its reduction in the presence of sulphuric acid and water by zinc or tin. Or by its reduction in the presence of hydrochloric acid by tin chloride; or its reduction by sulphur dioxid; or by the reduction of potassium nitrate in the presence of hydrochloric acid by tin chloride. Schlössing reports that nitrous oxid will be evolved by the putrefaction of milk in the presence of some of the nitrates.

This method has its disadvantages. The principal one is that the expense is so great as to be prohibitive for the commercial production of the nitrous oxid gas.

Ammonium Nitrate Method of Producing Nitrous Oxid.

The next chronological event in the history of nitrous oxid was its production, in 1793, by Deimann, von Troostwyer and others by heating ammonium nitrate. This, in essence, is the method employed by the manufacturers of to-day in the production of the gas, being economical and practical. Pelouze, in 1841, reported the production of nitrous oxid by heating ammonium nitrate in the

presence of sulphuric acid to 302° Fahr. The addition of the acid renders the evolution of the gas more certain and precludes the production of nitric oxid, but it presents difficulties in the production of other impurities that are almost, if not quite, as deleterious as the nitric oxid, as well as the danger of the explosive formation of the gas, generating so quickly, in some cases that it causes the retort to explode.

In 1828 Gronvelle, in 1838 Soubeiran, and in 1843 Pleischl advocated the manufacture of nitrous oxid by means of the mixed salts, claiming that by their use the cost of production was lessened and the danger of explosive formations would be eliminated. In 1891, W. Smith and W. Elmore secured an English patent for the production of the gas by the mixed salts.

Nitrous oxid may be prepared according to this method by heating potassium nitrate and ammonium chloride, sodium nitrate and ammonium chloride, lead nitrate and ammonium sulphate, sodium nitrate and ammonium phosphate or sodium nitrate and ammonium sulphate.

Later Methods.

In 1892, W. Smith found that nitrous oxid could be produced by the decomposition of ammonium nitrosulphate by hot water. In 1852, J. L. Smith advocated the production of the gas by heating ammonium chloride with dilute nitric acid to 212° Fahr.

Rudweber in 1867, and in 1870 Fremy found that nitrous acid and several of the nitrites were reduced to N_2O by sulphurous acid. In 1875 Meyer and in 1904 Guye and Bogdan reported the production of the gas by the reduction of nitrous acid or the nitrites by hydroxylamine sulphate. In 1880, Dumreicher used hydrated ferrous oxid as the reagent. In 1882 Zorn reported the use of sodium amalgam as the reagent, and in 1903 Meyer used sodium hyposulphite.

Meyers in 1875, Donath in 1877, and Guye and Bogdan in 1904, reported the evolution of the gas by the oxidation of hydroxylamine and its salts, using sodium nitrate, ferric sulphate, iodine or silver nitrate as the reagent.

The most recent methods of production advocate the use of air as the source of supply. Patents were issued to Sodermann in 1910 (France) for the production of nitrous oxid by oxidizing air in an electrically heated tube. France also granted a patent to Pictet in the same year, for the production of the gas by the same method except that he used an oxyacetylene flame for heating the air. Marston, in 1900, obtained an English patent for the manufacture of nitrous oxid by heating air in the presence of hydrogen or ammonia and an oxidizable metal such as copper or iron.

A recapitulation, then, shows that nitrous oxid may be produced by seven different methods, namely:—

1. By heating ammonium nitrate.
2. By heating the mixed salts.
3. By reducing nitric acid or the nitrates.
4. By reducing nitrous acid or the nitrites.
5. By reducing nitric oxid.
6. By oxidizing hydroxylamine.
7. By heating air.

Methods 1 and 2 are those used by most of the manufacturers of the gas with whom the writer is acquainted. But it would seem that method 7 could be adapted to commercial use so that the gas could be made at less expense than by the other methods.

Impurities in Nitrous Oxid.

There is no nitrous oxid on the American market that assays less than 94.1% pure, even by the most fallible method of analysis. That particular make when analyzed by the most accurate test known to-day (Baskerville and Stevenson's method) gives 95.9% purity.

The principal impurities found in American nitrous oxid are or may be chlorine, nitric oxid, nitric acid, ammonia, hydrochloric acid, carbon dioxid, oxygen, nitrogen and water.

All makes contain water to nearly as high as 0.2%; some contain ammonia; all contain a trace of oxygen and all have nitrogen.

Of these, the most objectionable are ammonia and nitrogen. In the percentages found, however, they are not really objectionable, neither are they conducive to a feeling of satisfaction or absolute safety. Ammonia irritates the mucous membrane and the nerve filaments therein, while nitrogen irritates the serous membanes and the nerve filaments with which the blood may come in contact. It is the writer's belief that the nitrogen (free) which is contained in the gas and which leaks in during an administration of the gas, causes the excitement of anesthesia and the unpleasant after effects sometimes displayed. It would seem that it were as well to eliminate these two elements from the gas.

Just why the ammonia is present the writer cannot say. He does know that one reason why the nitrogen content is present is because of the careless method of filling cylinders in use by some of the manufacturers, who simply force the liquid gas into the cylinder which is already filled with air at atmospheric pressure. There are one or two firms who exhaust the air (as much as possible) from the cylinders by means of suction pumps and when the vacuum reaches a determined height, turn in the gas. According to Baskerville and Stevenson these makers produce a gas whose purity is respectively 99.7% with a content of 0.16% nitrogen

and 99.5% with nitrogen, 0.35%. The makers who do not exhaust the air from the cylinders produce gas with these purities: 96.6% with nitrogen 3.25% and 95.9% with nitrogen 3.94%. It is evident, therefore, that the great percentage of nitrogen can be cut down by just a little care on the part of the makers.

The substance of the standard of purity for nitrous oxid adopted by the American Medical Association at Atlantic City, June, 1912, follows:—

"Nitrous oxid which is to be used for anesthesia should contain no less than 95% nitrous oxid and no solids, liquids, combustible organic matter, chlorine or other oxid of nitrogen. A small definite percentage of carbon dioxid may be present but the percentage should be made known."

The writer believes that it is better to mix the carbon dioxid with the gas as it is administered. Then the percentage given will be known and can be adjusted to meet the requirements of each case.

Aseptic Tooth Brush and Tooth Brush Sterilizer.

By Dr. Ernest C. Dye, Greenville, S. C.

Cognizance of the fact that ordinary tooth brushes become contaminated with extraneous matter, and of the impractical ideas set forth to render them clean has caused me to anticipate something better. I have developed the Formaldehyde Brush.

The tooth brush and holder should be constructed of bone or vulcanite, celluloid, glass, etc. When the brush is closed the formaldehyde gas exterminates the germs. The medication can be replenished when needed—the formaldehyde is to be put up in bottles containing cotton pellets saturated, say, two dozen pellets to the bottle. This will obviate sending liquid formaldehyde through the mails, and the pellets are handy to be inserted. After reading an article in *Cosmos,* January issue, 1912, I designed the brush. The article is entitled "Bacteriology of Tooth Brushes."

"It is claimed by Smale & Jones that a tooth brush becomes septic after one using; each hair becomes an inoculation needle, and the person using it may be vaccinated with such germs as flourish on it. The tooth brush, therefore, as popularly used, namely, for many months, may be the origin of pyorrhea alveolaris, which may lead to such grave consequences as anemia, gastritis, and arthritis. The prevalent tooth

powders and tooth pastes as commonly used do not render the tooth brush aseptic, and even a solution of 1 in 20 carbolic acid is not effectual. The authors insist that all tooth brushes should be boiled for five minutes before and after use. A new tooth brush can be used each day. Those wishing for a more prolonged use of a tooth brush can rinse the brush in tricresol (1 per cent.) or allow it to stand between use in formalin (10 per cent.)." *British Medical Journal,* per *Journal of American Medical Association.*

I knew that only a very few would follow those instructions, so the formaldehyde brush is the result. Dr. Wm. Litterer, A.M., Ph.G., M.D., professor of histology, pathology and bacteriology of Vanderbilt Medical and Dental Departments, Nashville, Tenn., has been inoculating several strains of bacteria into the brush bristles, subjecting them to the gas and making cultures to see if they are killed.

Tests by Prof. Litterer.

Dr. Litterer's report is as follows:

"The result of my experiments with your aseptic tooth brush is as follows:

"Experiments were made with the full strength of formalin (formaldehyde gas 40 per cent. in water). I used the following bacteria to test the germicidal power:

"(1) Streptococcus pyogenes.

"(2) Staphylococcus pyogenes aureus.

"(3) Bacillus typhosus.

"(4) Pneumococcus.

The following method was employed, viz.: The tooth brush was rendered sterile by superheated steam (autoclave). The sterile brush was dipped into a pure culture of (1) streptococcus pyogenes and was then returned to the receptacle to be acted upon by the formaldehyde gas. All of the above germs were treated in like manner and in every instance double controls used. Both positive and negative controls. The result was that complete sterilization was effective in less than an hour's time. By drying the brush with the bacteria adhering to same, the effectiveness of the sterilization was greatly impaired. The above results were obtained by using only the full strength formalin. No dilutions were used. The question as to whether it would be too irritating to the gums can be answered in the negative if the brush were rinsed in water before using. The method appears to be a very effective and unique way of sterilizing a tooth brush, and in my opinion should be seriously considered by the dental profession."

The brush, as can be seen from the drawings, is made in three parts, the cap, which contains the medication, the barrel and the brush bristles,

fastened into a stopper or holder. Threads are cut into the stopper for screwing into the barrel; also threads are cut in the cap for screwing onto the barrel. All must be air-tight so that gas cannot escape. The cap can be easily removed to replenish the cotton and medication when needed. Within the cap is a cartridge or shell (non-permeable) and removable, so that the formaldehyde liquid cannot escape through and stain the handle, which it would do if it were not for the retainer. When the bristles wear out, throw that and the stopper away, but keep the barrel and cap and buy only the bristles and stopper anew. That will reduce the expense of the brush.

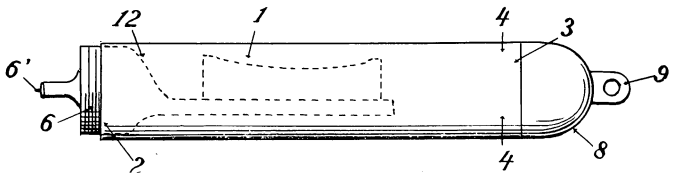


Fig. 1.

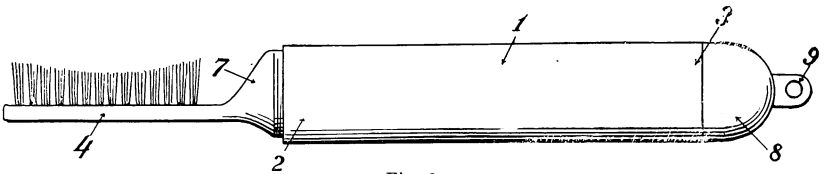


Fig. 2.

I have been using a brush designed as described for twelve months with a 40 per cent. solution of formaldehyde and have not experienced the slightest injury to the teeth nor the soft tissues, and the brush bristles seem to be clean and smell sweet always. Of course, the brush bristles are inserted into the receiver while in a wet condition. As Dr. Litterer says, the formaldehyde gas has better action on them in this condition than if they were dry.

Mouth hygiene is being preached everywhere, and I think the formaldehyde brush comes at an opportune time, for it is only keeping pace with modern sanitation. The ordinary tooth brush is a veritable camping ground for hosts of germs, and should be discarded, for such a brush will cause pyorrhea alveolaris, anæmia, gastritis and arthritis. I really think this brush will be a great aid to the practitioner in his endeavors to treat pyorrhea alveolaris. I have a touch of that disease and have obtained benefits from the use of the aseptic tooth brush.

The cotton pellets, from my experience, should be replenished about every two weeks. These pellets are to be made to fit easily into the cartridge and they are to be kept in a hermetically sealed bottle or jar.

Description of Illustrations.

Fig. 1 is a side elevation showing the brush proper enclosed within its handle; 6′ is a lug to either screw into or screw from the handle the brush bristles; at 6, there are screw threads that work both ways; at 12 is an annular chamber to receive the moisture from the bristles which flows out on opening, so that the moisture does not get on the cotton (formaldehyde) in the other end; at 9 is a ring for suspending the brush.

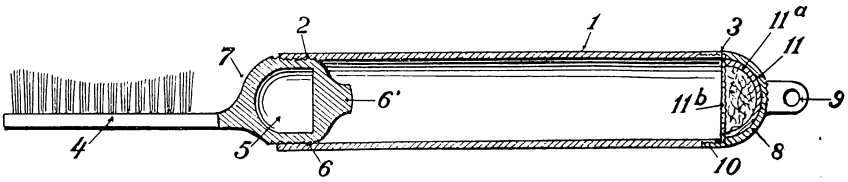


Fig. 3.

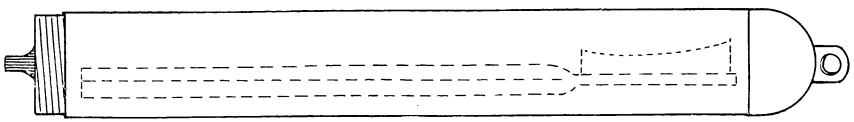


Fig. 4.

Fig. 2 is a similar view showing the brush arranged for use.

Fig. 3 is a vertical longitudinal section through the parts as shown in Fig. 2. At 3 the cap screws onto the barrel and can be easily detached to replenish the supply of formaldehyde. No. 11a shows a porcelain (or any non-permeable material) shell, or cartridge for holding the formaldehyde on cotton—it is removable. No. 11 shows the cotton saturated with formaldehyde. 11b shows a wire screen to keep the cotton in place.

Fig. 4. Sterilizer adapted for use with any brush.

A Plea for the Use of the Microscope.

By John S. Engs, Oakland, Cal.

The great wave of commercialism which continues to flow over this country and in fact over the whole world, leaves us a choice between exerting our best energies against the ever-swelling stream of competition; or giving up the fight, sinking and being lost. There is no halfway course. We have little time to consider the niceties of life, little time to think of anything that does not bear the "dollar mark."

This is an age of new blood—conditions are such that only those of unusual mental and physical vigor can stand the strain. We hear that all this crying of reform is only the "outs" squealing against the "ins," and that "it is not the best man nor the most honest that gets there, but the *smartest*," and yet there seems to be a tendency towards the betterment of things all along the line.

The time has been, and that not many years back, when the fakirs and charlatans in our own calling seemed to fill a popular demand, and in spite of "Old Abe," who said that "you can't fool all the people all the time," a good many did not seem satisfied until they had had it "handed out to them" several times.

There are all kinds of dentists, as there are all kinds of men, some are good, some are excellent, and some are, well, let us be charitable. The latter do not last very long. To succeed in anything calls for hard work, and it sometimes takes a long time for a man to get to the top, if he keeps to the straight and narrow way. But if he persists, has sufficient backbone and is willing to practice some self-denial for a few years he may pass some "hares" on the way and get there before they do; for I am inclined to think that brains and skill will tell in the long run.

The Making of a Good Dentist.

To be a first-class dentist, one must possess not only high manipulative skill, but also good judgment and a knowledge of the *why* of the thing. This can be attained only through close observation and by studying the hidden things in nature—hidden to most of us, but not to those who are trained to search for them. One of the greatest aids that we can employ in this search is the miscroscope, and having once engaged its services we are loth to set it aside, for we know how it has revealed the minute organic cells, aggregations of which form the tissue of our bodies; we know how misplaced clusters of some of these cells may form morbid growths which endanger life; we know also that small vegetable forms enter living tissues and under favorable conditions develop and multiply, bringing about destructive changes in those tissues which may so disturb the normal state as to seriously impair the health of the organism.

We know these things because the microscope has shown them to us. Anyone can see how a knowledge of these things is essential to a practitioner of medicine; but of what use are they to one intending to practice dentistry? Of what use are they to one who merely fills teeth and makes artificial substitutes for those that are lost? Well, let us think it over. To some of us all teeth look alike; some are hard perhaps and some are soft; some decay and some do not. Do we ever think why some teeth decay more than others?

Cause of Caries.

Some say that decay is due to uncleanliness and that if they could have had the teeth under their care at an early stage they could have prevented it. I believe myself that much decay is due to neglect and that it could be held in check by purely mechanical means, but I also believe that there are other influences (producing structural changes in the teeth themselves) which render them internally more susceptible, and that the changed internal conditions permit of greater destruction from the chemico-bacterial attack.

Those of us who have examined sections know that teeth in some instances may be badly decayed long before there is any cavity visible in them, and that the margin of a cavity by no means represents the circumference of the decayed area.

We have seen, too, that teeth are of very complex structure with many things about them that we cannot yet understand.

If we study the teeth in health and in disease we shall know why a non-conductor of heat and cold is more to be desired over a nearly exposed pulp than a metallic filling, and such little things as that. When we have a knowledge of the various micro-organisms found in the mouth, and the possibilities inherent in them, we are better able to prepare putrid pulp canals in teeth for permanent filling, because we know what pus organisms are and of what they are capable. We know that we can do some things with the teeth of elderly patients and in cavities that have been temporarily filled with a non-conductor, that we could not do in younger teeth and in very deep cavities when first filled, because the microscope shows us that in the one case the retreat of the pulp has left much tooth bone behind and in the other that a reparative process sometimes takes place which results in a deposit of calcareous matter over the pulp, between it and the outside.

Familiarity with the structure of teeth and their anatomical relation to the jaws will help us greatly as a means of comparison, when we are on the lookout for such diseases as pyorrhœa alveolaris and other lesions of the gums and oral mucous membrane.

The foregoing paragraphs just present a few rambling thoughts which suggest themselves to us as a plea for the use of the microscope by dentists and if I did not fear to bore you I might mention others. To conclude—we may take the word of others that these things are so, but to see for ourselves is to believe and be convinced.

The Rational and Successful Treatment of Tetanus.

By Dr. Byron E. Fortiner, Camden, N. J.

Lockjaw often results from the interrupted dentition of the third molar teeth. It may be caused by the impaction of a deciduous tooth. It may result from an abscessed tooth, or the neglected roots of teeth: and it has been caused by the incomplete removal of a dental pulp and the improper filling of the canals; or it may come from accidental fractures of either teeth or jaws.

It is the privilege and duty of the dental surgeon to know how to treat both surgically and medically these serious lesions resulting from diseased conditions of the teeth. A dentist is often called upon to extract a tooth that is sore where the peridental membrane is greatly inflamed, and in some cases an incipient abscess is present. I prefer not to extract these teeth because the majority of them require more treatment after extracting than is required by proper treatment to prepare the tooth for extraction. The following treatment will shortly reduce the swelling, relieve the soreness and correct the pus-forming process. The tooth can then be saved if it is worth it, or extracted if it should seem best to remove it.

Antiseptic Wash.

The first thing of importance is a proper antiseptic mouth wash. The following has given me most satisfacory results:

℞ Kennedy's dark pinus Canadensis.... ℥ ij (2 drachms)
Listerine ..... ℥ ijss. (2½ ounces)
Water .....q. s. ℥ vi (6 ounces)

Mix. Sig.: To about a tablespoonful of this wash add four tablespoonfuls of hot water or enough to wash the mouth with three times. Take one and hold in mouth for three minutes; also the other two for three minutes each. Repeat this about every two hours and then less often as the case improves.

If possible, and the tooth is not too sore, place formocresol in the pulp chamber on cotton, sealing it in with cement. But if the tooth is very sore this is not absolutely necessary. I give internally

℞ Calcarea sulphuricum ..... ℥ x

in one-half grain tablets, a 4-drachm phial. Sig.: Take two of these every four hours right along until all is well and healed.

This remedy retards and prevents the formation of pus, produces absorption and reduction of swelling and induration, and should be continued until parts are well whether tooth is extracted or not.

If you will try this remedy you will be pleased and satisfied with the results. As to the extracting of abscessed teeth, I believe the far wiser plan is to cure the tooth first and extract it afterwards. If the abscess is fully developed and ripe so that pus will discharge if tooth is extracted, I then remove it, but in all other cases to disturb this tooth will have the tendency of spreading the infection. This must be combated, and I find that patients are much more apt to follow my directions quite faithfully before the tooth is extracted, but after extraction they imagine their troubles should be ended, and in many cases do not submit to the proper treatment, but if the pain comes back go off and put a poultice on the outside of their faces, thus inviting the condition most to be dreaded, viz., suppurative osteomyelitis. In cases where a patient will faithfully follow instructions, the treatment given by Dr. James F. Hasbrouck, of New York City, in ITEMS OF INTEREST for January, 1913, page 64, is excellent. If, after this treatment, pain still exists, I would prescribe:

℞ Potassium iodide ..... ʒ i (1 drachm)
Oil of birch ..... gtt. x (10 drops)
Pulv. ext. licorice ..... ʒ ss. (½ drachm)
Glycerine ..... ʒ vi (6 drachms)
Aqua .....q. s. ℥ vi (6 ounces)

Sig.: Take two teaspoonfuls every two hours while pain is severe; after that take same dose after each meal as directed.

A very excellent treatment of abscesses is laid down by Dr. J. P. Buckley, of Chicago, in the *Dental Digest* for June, 1906, page 625, and these remedies should be used as symptoms indicate. I give the patient also, in case the pain comes on in the night and he cannot sleep, five tablets each containing:

℞ Antikamnia ..... grs. 4¾
Codeine sulphate ..... grs. ¼

Sig.: Take one every half-hour for pain until three are taken.

The antiseptic wash is, of course, to be continued until all is healed. This treatment will preclude the possibility of either necrosis, pyæmia, septicæmia or tetanus. I beg of you not to use peroxide of hydrogen in the sockets of teeth after extracting. I have seen cases where it has produced necrosis of the bone. It has never happened to me for I have never used it for this purpose, but have treated cases where other dentists have used it with very damaging results. It is an oxidizing agent of high power, and it oxidizes and destroys the bone.

Treatment of Tetanus.

Tetanus cases have come under my care for treatment, and suffice it to say that every one so far treated has made a good recovery, so that the first and last word about this prescription is that it cures tetanus. Its action is wonderful. It destroys the virus of the tetanus bacilli; it produces muscular relaxation, removing the spasm and trismus in a few hours, and relieves the pain in a still shorter time, and strengthens the heart. Whether it destroys the tetanus germ is not known, but it does destroy its virus (the poison of a morbid process).

This remedy has been so very successful in my hands that I have felt for some time it was my duty to give it to the dental profession and to the medical if they will accept it. It will prevent necrosis and septicæmia or pyæmia and induce healing if packed in any poisoned wound, injected through an infected abscess with sinus, pyæmia of the antrum or in cases where necrosis already exists. But its most magical effect is where tetanus already exists. While it is applied locally to the wound or affected part, no matter where, after being washed with a 1 to 1,000 solution of corrosive sublimate or a normal saline solution, the wound should be packed with gauze soaked with this solution, kept wet constantly or changed three times a day. The remedy is primarily an internal remedy, and it is the only medicine needed in tetanus, as it does all that is required, viz.: destroys the virus of the tetanus bacillus, produces complete muscular relaxation, and strengthens the heart. Teaspoonful doses, or even twice that amount for an adult, every half hour for three or four doses; and if patient cannot open the mouth, pull lips away and pour solution back of the molar teeth; or it may be given through a tube through the nose, or it can be given by enema. If administered by this method twice the dose must be given. The dose can be lessened after relaxation begins to take place. Give no morphine or other narcotics as this medicine will soon relieve the pain. Patient should be told to let the attendant know if any nausea is produced (I have never seen any). If so, stop the medicine until stomach is settled, then begin again until patient is weak—make him weak. There is no danger from this. It may take six or eight or twelve hours to accomplish this. When relaxation occurs the poison will be eliminated and the patient cured. Keep the room darkened and as near an even temperature as is possible with good ventilation; avoid draughts.

Nourishment

Nourishment must be given. Give one-half to a full cup of warm milk every hour or so during the entire course of treatment. If it cannot be swallowed it must be given by enema. When relaxation is complete—not before—a little brandy and warm milk may be given, but there is no

hurry about it. It can be given every hour for a few times. This can be followed by an egg, beaten up with a little sugar and a cup of warm milk and two teaspoonfuls of brandy. This can be repeated if desired. The patient will soon feel stronger, although for several days the patient should be kept quiet and take a teaspoonful of the tetanus specific three times a day as a safeguard and to thoroughly rid the system of the poison. Beef tea, mutton broth with rice, gelatin, raw eggs, milk, tapioca, custard pudding may be given. Light, easily digested nourishing foods will soon complete the cure.

The Tetanus Specific.

℞ Tr. echinacea angustiflora..... ℥ i (1 ounce)
Eucalyptol ..... gtt. v (5 drops)
Third prep. Lobelia inflata..... ʒ ij (2 drachms)
Tinct. gelsemium semp..... gtt. xl (40 drops)
Tinct. Cactus grandiflora..... ʒ i (1 drachm)
Glycerine..... ℥ i (1 ounce)
Cinnamon water.....q. s. ℥ viij (8 ounces)
Mix. Sig.: As directed.

Third preparation of lobelia is:

℞ Pulv. Lobelia inflata (seeds)..... ʒ ix (9 drachms)
Gum myrrh ..... ʒ iij (3 drachms)
Pulv. capsicum (African)..... grs. xv (15 grains)
Gum kino ..... ʒ ss. (½ drachm)
Alcohol ..... O i (1 pint)

Mix. Sig.: Allow solid parts to dissolve, then use the clear liquid; that is, pour it out of the bottle without shaking.

It will be noticed that each drug is in comparatively small proportion, and this is why the remedy is so absolutely safe. It is the proper quantity of each that does the work. In having this prepared, great care should be exercised to guard against substitution or carelessness in compounding. In my preparation I have procured my drugs from the most trustworthy drug houses, and only in that way do I know that no substitution has been practised upon me.

A reliable compound can be obtained of the Purinul Chemical Company, of Camden, N. J., where it is prepared under my personal supervision. It being so much less costly than the very expensive serum treatments, it should be brought within the reach of all. From its won-

derful action in every case so far treated with it (every one being cured) I am forced to believe that unless the patient is almost dead before treatment begins, every case should be cured.

A detailed report is respectfully requested by the writer of any dentist or physician who gives it a trial. Is this asking too much? I am giving you the whole treatment; this is the whole formula in exact proportions. Any dentist or physician can make it for himself. It represents years of study and work. I know I have a good thing, and I will receive some remuneration in the knowledge that I can prevent and cure human agony and save human life.

American Society of Orthodontists.

Discussion of Dr. Dewey's Paper.

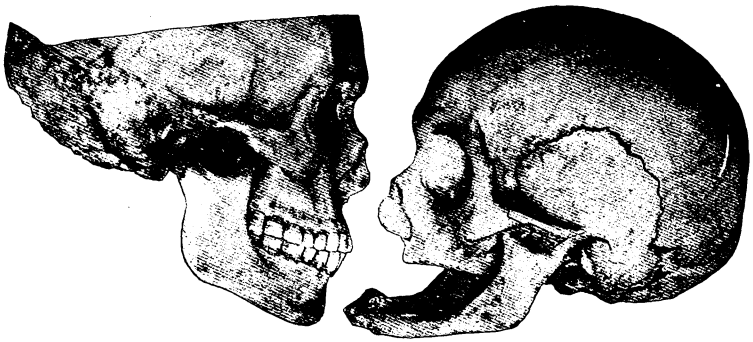
Dr. M. N. Federspiel, Milwaukee.

Dr. Dewey's lecture on the development of the maxillæ and nasal cavity with reference to expanding the arch and opening the suture is deserving of the highest praise. I am sorry that Dr. Dewey did not furnish me with a manuscript so that I could follow him and carry on the discussion in detail.

I agree with Dr. Dewey, and I have believed for years back, that it is an impossibility to open the maxillary suture. I am not so well versed in embryology as I would wish, although I took some interest in it when at school, but if embryology is the foundation of medical science, you cannot be successful in any line in medicine unless you have a thorough knowledge of embryology and anatomy.

I wish to take issue with Dr. Dewey regarding one matter, and that is clinical evidence. I cannot for the life of me understand why so many men are afraid to make an exploratory incision. Suppose each man in this audience took five clinical cases and made a radical expansion of the arch, then injected a local anesthetic and made an exploratory incision. What better evidence do you want? The surgeon frequently makes exploratory incisions which tell the story. I have done it about six times under novocain anesthesia, retracted the flaps, and found no opening of the suture. I cannot understand what better evidence you want.

You may say, I only report six cases. True. I cannot do it in all of my cases, but I do think that if, say, fifty men could each take two cases, and then have a report of one hundred cases, the evidence would be sufficient to settle the question now and forever as to whether we can or



A B

Fig. 1.

A B

Fig. 2.

cannot open the maxillary suture. Further than that, I do not care to enter into a discussion of Dr. Dewey's paper.

I would like to ask Dr. Dewey a question, namely, What do you mean by the change that takes place in the palatal fold? Is there a change in the position of it, or is there an embryological change in the tissue itself?

Dr. M. H. Cryer, Philadelphia.

It is not necessary to discuss Dr. Dewey's lecture, but I wish to say this, that I have come all the way from Philadelphia to this meeting for a certain object, and feel doubly repaid for my journey by listening to Dr. Dewey's remarks, and having this opportunity to see some of the results of his splendid research work. I only wish he were not so far away, that I could see more of his investigations. (Applause.)

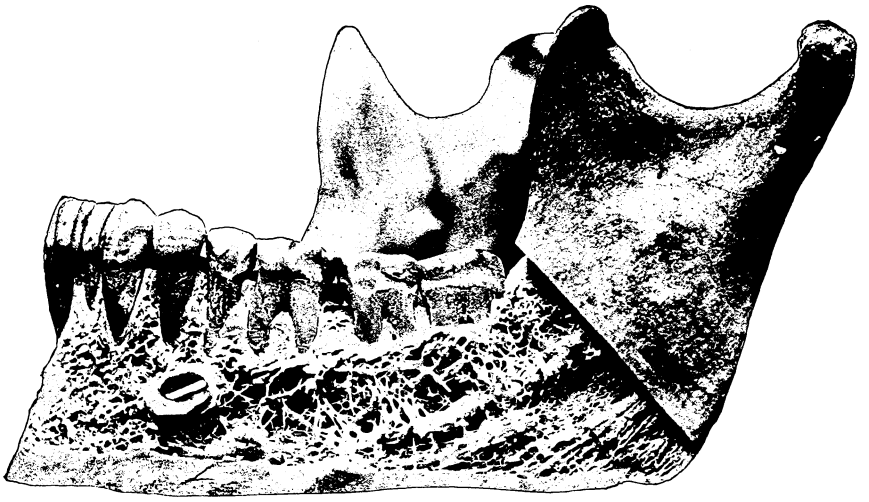


Fig. 3.

I should like to have a few slides thrown on the screen, not for the purpose of criticizing anything Dr. Dewey has said, but in support of some of his statements.

Fig. 1. He spoke of the young skull with the teeth in position, and said that when the alveolar process of the teeth develops, everything is built on the outside. In this slide we have two pictures; the left is from a skull of a person about twenty-five years of age, while the other is from a skull of over seventy-five years. I show these to illustrate the building up on the outside of the alveolar process with the teeth which belong to it. When these teeth are lost, this built-out portion is also lost, and we almost come again to the original size of the child's jaw, or the roof of the mouth as shown in the aged skull.

Fig. 2 gives an under view of the same skulls. The younger one shows that the process of the upper jaw has been built out, not depend-

ing on the opening of any suture. In the aged skull is shown the extent the upper jaw is reduced by the loss of the teeth and alveolar process. It will be noticed in both slides that the lower jaw develops in a different manner. The body of the lower jaw increases in size by interstitial growth, and the alveolar process is built on this structure; consequently, when the teeth and alveolar process are lost the lower jaw retains its circumference to a great extent.

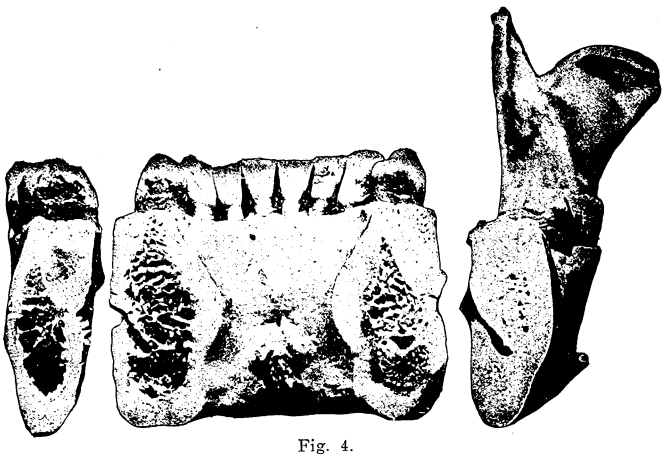


Fig. 4.

Dr. Dewey spoke of the growth of bone by irritation. To some extent I agree with him, but in many cases I would prefer to think the increase in size was due to hypertrophy or deposit of bone rather than growth.

Fig. 3 shows the cortical portion of the mandible removed, exposing the beautiful arrangement of the cancellated tissue of the internal structure of the jaw. There has been no irritation, consequently there has been no increase in size or deposit within this structure. If the curvatures of this internal structure be observed, it will indicate to you how each tooth has been carried forward to make room for the erupting posterior teeth.

In Fig. 4 we come to Dr. Dewey's point as to irritation causing growth of bone. In the left side of this specimen, the normally open cancellated tissue shows the condition that permits the orthodontist to correct irregularities, but on the right side he would be unable to change the position of the teeth, because the osteoblasts have deposited bone within the cancellated tissue, making it unyielding and dense. In this particular case the pathological condition was produced from irritation caused by a diseased first molar.

Dr. William J. Brady, Kansas City, Mo.

I think we are to be congratulated on having so excellent a paper from Dr. Dewey, and I think Dr. Dewey is to be congratulated in having this audience. This recalls certain circumstances that occurred in this city a number of years ago. Dr. Dewey had read a paper before the American Society of Orthodontists; it was not as deep as the one presented to-day, but still, deeper than the ordinary run of papers, and hardly a word was said in discussion. Dr. Dewey felt rather discouraged that his paper had not been discussed, when I said, "Young man, they paid you the greatest compliment they could in not discussing it—they acknowledged it was deep, deeper than they could wade in." Now to-day he has a paper far beyond that one and we have had a most excellent discussion following it, one in which we feel we understand something about the subject, which shows that this society has grown, as well as Dr. Dewey. We know that when Dr. Dewey talks we will always hear something good, but I think he has shown himself exceptionally brilliant in this case, and has given us a great many facts which we were just ready to have set before us, out of which we certainly have got much good.

There is one feature of this paper and its discussion in relation to our friend, Dr. Barnes, that I wish to touch upon. It must not be thought that because there is a great deal of talk against opening the suture that we are trying to discourage or discredit Dr. Barnes. He is working on the same problem as the rest of us, which resolves itself into the question "how do the bones of the face normally develop, and how do we get the development we are all working for in orthodontic treatment?" He has contributed his mite of light on the subject, and all these other things are merely contributions toward solving the same problem, not arguments directed against Dr. Barnes and his findings. We are trying to get at the facts and come to some reliable conclusions, and while the opinions of Dr. Barnes and others differ, it must not be taken that there is real antagonism between Dr. Barnes and Dr. Dewey or the other speakers. I am sure Dr. Barnes is charitable enough to take it in this light.

In another year from now, if the Board of Censors is kind enough to ask me to take part in the program, I hope to contribute another chapter to this subject. While we have been discussing the matter for several years, yet there is much more to consider before we shall have reached the end.

Dr. J. Lowe Young, New York City.

I want to ask Dr. Dewey one question. I do not know whether I misunderstood him or not. If I understood him correctly, I want to take issue with him. In speaking of the slide that had the two

upper arches, one a deciduous and one a permanent arch, after examining them he said he did not see any use in developing the deciduous arch in order to make room for the permanent teeth. Is that correct?

Dr. Dewey. I believe I said there is no use in making the deciduous arch wider than the permanent arch.

Dr. Young. Am I to understand that you do not see any sense in making it wider by opening the suture, or making it wider in any way? Which it it?

Dr. Dewey. Why should you throw the deciduous teeth out to occupy the same width that the permanent arch is going to have, when with the eruption of the permanent teeth the arch will develop?

Dr. Young. If that is your position, Doctor, I will take issue with you in this way: the full complement of deciduous teeth are in full eruption at three years of age, or before, and almost inevitably the incisors are in contact with each other at this age. Dr. Barnes has shown by slides that this condition does not prevail at five years of age where normal development has taken place. I have a beautiful specimen in my office which shows that at five years of age there are pronounced spaces between the deciduous incisors, and also between the incisors and cuspids. This is the normal position for these teeth where normal development has taken place. The majority of children will show absence of such spaces between the deciduous teeth, at five years of age. Why? I should say for the same reason the essayist has said, namely, it is due to a lack of use or a lack of stimulation that the bone has not developed. If the child were chewing spruce gum all day long and tough beefsteak, rubber bands, and so on, we should have far more development and far more space between the deciduous teeth. Dr. Ferris has advised that the child should take so many bites on a rope of rubber after each meal, and it is a good thing if done conscientiously and systematically. If Nature does not bring about this development up to five or six years of age, I will say up to the time the first permanent molar starts to erupt, the orthodontist who does not start in with the treatment of such a case at that time is derelict in his duty. This is the ideal time to treat every case of malocclusion. If I were building a house and found a mistake in the foundation, I would not wait until the house were built to correct it. The permanent incisors are wider than the deciduous ones and unless

spaces develop between the deciduous incisors as specified above, malocclusion will be the inevitable result when the permanent incisors begin to erupt. Where such under-developed cases are properly treated at an early age, and sufficient room created to accommodate the permanent incisors before they begin to erupt, it has been noted that while these teeth may start to erupt in a rotated position, that the constant tongue pressure will cause them to assume their proper position during the eruptive period. I have yet to find a man who could tell me how long to hold lower incisors that have been in full eruption in a rotated position, so that they will not rotate back when the retention is removed. I do know that lower incisors which have been rotated as they erupted will remain in the normal position after three months' retention.

Dr. R. Ottolengui, New York.

I would like to begin my discussion where Dr. Young left off. If I understand Dr. Dewey, his argument is that if the deciduous arches are in normal occlusion, there is no good reason why the orthodontist should undertake to enlarge them to the size of adult jaws at an age so early that there is a possibility that Nature will work out the development. With this I am entirely in accord. On the other hand, Dr. Young, Dr. Barnes and others argue that where we find an absence of spaces between the anterior teeth at a time when normal development should have caused such spacing, it would be well for the orthodontist to artificially enlarge the arches to make room for the second set. With this I am also in accord. But I cannot lay down any binding rules, such as those which Dr. Young has attributed to Dr. Barnes, and say that at the age of three the temporary teeth may be all in contact, whereas at the age of five the interproximal spaces should appear.

I wish we might stop talking about patients who are "three years old," "four years old," "five years old," etc., etc. Some men make it a rule to write the age of the patient on their record models. To me the age is a matter of only secondary importance. I endeavor to study my cases, not by the age of the patient, but by the period of eruption which presents. For example, when we find the sixth year molars just erupting, we should understand what the normal conditions of the temporary arches should be at that period. With the appearance of the incisors, we have another period of development, etc., etc. If we are familiar with the normal conditions which should prevail at these various stages of tooth eruption, we could easily diagnose a lack of development and the nature of interference needed, but I know of no one who can positively state what a child's arch should be at a specified age. For example, I have a girl in my care who is thirteen years of age, and who has fully erupted her entire denture including the third molars; but I have another

girl who is seventeen years old, in whose mouth the first upper bicuspids are just breaking through, while the four second temporary molars are still in place, as are also the upper temporary cuspids.

There is no doubt in my mind that if we could have had casts of the first girl at the age of five, we would have noted the spacing between the temporary teeth, said to be due at that age; but I am equally certain that no such spacing would have been found in the mouth of the second child, even at the age of seven. But where an individual develops as slowly as this last girl, who can say at the age of five that her jaws would not develop merely because there were no spaces between her teeth? or to put it in another way, How can anyone say by examining the mouth of a child five years old, before the appearance of any second teeth, whether the time for the spacing of the teeth has arrived yet or not? Personally, I think it quite safe in the majority of cases to await the appearance of the sixth-year molars before making any orthodontic interference. Of course, there would be exceptions to this rule—extreme distal occlusion or evidences of Class III conditions being among the exceptions.

I would like to say just a word about opening the suture. As you all know, at the St. Louis meeting, I read a paper describing a split plate, made of vulcanite rubber and carrying a wooden wedge, which I had long been using for rapidly extending the upper arches. There was no doubt then, and there is no doubt now, that with this appliance the teeth may be moved buccally *en masse*, and for this reason I was under the impression at that time that this lateral expansion was produced by an opening of the suture. But the criticisms which I met at that meeting were such that I must confess I have never used the plate since. I was somewhat surprised recently to learn that whereas my experience in St. Louis caused me to abandon the plate, my St. Louis paper had induced Dr. Jos. D. Eby, of Atlanta, Ga., to adopt this method, and not only that, but he has been calling it the "Ottolengui Suture Opener." I wrote him a letter, questioning the propriety of using such a name for the plate and expressing a doubt as to whether the suture is really ever opened. I would like to quote from a letter from him in which he gives some rather interesting views as to what actually occurs when the upper arch is spread with this appliance. Dr. Eby writes as follows:

"If you will consider the stresses as applied by Ottolengui Suture Openers, it must be remembered that only a normal stimulus is applied so that the osteoclasts may perform their normal functions of bone destruction in the vicinity of the applied force, which, in turn, stimulates the osteoblasts in their functional behavior of reconstructing new tissue in turn.

"Now, by the means of this normal stimulance so perfectly applied in the Ottolengui Suture Opener, it has been my observation, as shown by the wonderful improvements in breathing as well as by actual measurements, that the dome of the arch is not only broadened laterally, but the floor of the nose is lowered also.

"Therefore, under this slow reconstructive change, there need be no material necessity for the suture to actually be separated in order to secure the desired results.

"This question of suture opening which has come before the orthodontic world so universally, is one which is of very deep interest to me, because it involves all of the fundamental principles in the reconstructive tissues and is based upon the principles on which we all should strive, founding our work as nearly as possible on a return to normal."

I should say that Dr. Eby is a teacher in the Atlanta Dental College, and that he has had a great deal of experience in the use of this appliance in the infirmary in that college. Let me add here that it will require a lot of evidence to convince me that the nasal floor can be lowered.

Dr. Varney E. Barnes, Cleveland.

It seems to me that the explanation given by Dr. Ottolengui, as brought out by Dr. Eby, is rational —in fact, the most rational supposition that has been put before us, and it seemed from the X-rays I showed yesterday, in which I took one X-ray one month and the other one the next month, that space is filled up, so that this apparent opening, which seems to be an unfortunate term and is misunderstood, is really or possibly a means of disposition of bone between the margins of the suture, or the margins of the suture completely fill it.

I have been interested in Dr. Dewey's illustrations, and it strikes me that he is in the same predicament that Darwin was; he has not found the missing link. When we draw a parallel between lower animals and human beings we must have that question of doubt which is scientific—always think of everything with a doubt. We may believe in a thing for the time being, but question it nevertheless. Everything presented in Dr. Dewey's paper is with a doubt. We are simply studying this question.

Of the two specimens which Dr. Dewey handed around there is one in which the teeth are loose. This is a control specimen without any orthodontic interference or pressure interference. The other specimen shows, shall we say, ankylosis of the cuspid teeth, and also rigidity of the attachment to the other teeth in which no attachment was made, and in which there was no interference so far as I can determine. This raises a serious question. If the application of power in the manner described causes ankylosis of the teeth interfered with, or interference with the

dental arches after they have formed, it is a pretty serious problem. The alternative is preventive orthodontia under physiological pressure.

Before I leave the subject, however, I want to say that after regulating a certain case years ago with the horizontal hinge, and not being satisfied with the result, I called the case in again and did the work over. I treated the upper and lower arches in the same manner tried it for a year, and could not accomplish what I desired, and the girl laughed at me. We used ligatures. Evidently in that case there was ankylosis. This lower arch was deficient in its spreading. It is reasonable to assume we are going to have impacted eruption from an abnormal condition; that the patient is apt to suffer more or less reflexly, not necessarily pain. His contention that bone develops from mechanical stimulation is entirely correct. There is no question about that. The suture may still be opened under that stimulation. I say opened. We must loosen the attachments to the bone still deposited in there under the stimulus. The periosteum is still there and has the power to deposit bone. No one has claimed that bone deposits more rapidly in the suture than it does in other places, nor that development stops there. In these cases of deformity I would assume with reasonableness that there was defective development; that development should have gone on from that point and did not. I do not believe, nor do I claim, that the entire width or development of the jaw is completed at or near the suture. Development takes place peripherally. When the teeth are loose, the alveolar process is loose and the jaw grows smaller, or we see an apparent deciduous jaw. Now, then, I think when we put pressure on we should try to imitate what seems to be normal development. We have had presented to us the evidence of anatomists, histologists, and physiologists; evidence which is taken from the cadaver, and many of these slides were given to us as specimens of normal development, showing eruptions of the teeth, or the teeth ready to erupt, showing them in their crude condition, a condition of embryonic formation, but which condition should not continue much after three or four years of age. It is almost entirely lost from five to six years of age, which is the growth period approximately.

In the study of Italians, which is the best early developed race I have ever got hold of, I found some forty developments which in my critical examination I was pleased to call normal; that is to say, there were forty out of nine hundred and eighty. Thirty-five per cent. of the nine hundred and eighty were classed as normal developments by the general dentists in examining them. I could not so class them.

It has been claimed by Dr. Dewey that this interference in the small jaw, where the teeth are in normal occlusion, is not warranted; that the teeth will develop or simulate development. Some ninety-seven per cent.

of the people of our civilization, the Caucasians, have deformities of the jaws; twenty-five per cent. of these cases do not develop in response to this stimulus. The anatomists have given us specimens of patients who died because they could not live and grow. They were not normal. They have no evidence and no proof that these cases were normal. The best evidence we have to-day is that which we have gathered from clinical observation on living patients during development, which the histologists and anatomists have not yet paralleled. I think they can work along that line. These investigations ought to be continued, but they ought to parallel the investigations, considering the means we have of watching, in the human being. We must X-ray these animals as we do human beings. I will help all I can in this way, but we must not jump at conclusions, and Dr. Dewey is trying to draw deductions from a number of specimens which I think are wrong.

Dr. Martin Dewey. I feel very much pleased with the discussion, because it is the first time in my life I have ever agreed with Dr. Ottolengui. (Laughter.) He says you cannot take a child five or six years of age and say that individual will not have a normal arch at seven, because youngsters do not develop at the same age. Furthermore, Dr. Barnes admits that the deciduous arches do develop; that a space is formed between those deciduous teeth, and that when he finds no space forming he puts on his appliance. While I am in agreement with Dr. Ottolengui, I would like to ask Dr. Barnes: How does he know they will not develop at six years of age; how does he justify himself in expanding the deciduous arch to the width of the permanent teeth? These men try to do everything Nature should have done, and probably will do in the majority of cases. An appliance will at least assist if the incisors are rotated and there is not room enough for them; then there is some reason for expanding the arch, but there is no reason for expanding the arch in order to make room for the permanent cuspids to develop. I believe clinical observation is a poor thing to judge by.

Dr. Barnes makes the statement that possibly in that animal in which I put on an appliance I got ankylosis of those teeth. I did not get ankylosis of the teeth. There is no evidence that human teeth or teeth attached to the alveolar process become ankylosed. There is no evidence that cementum and bone ever unite. You have ankylosis of the teeth in fishes and in the lower animals. You do not have a peridental membrane. You have union or approximation of bone and growth of the bone and cementum which is limited to the amount of peridental membrane in the alveolus There may be locking or dovetailing of these two tissues, but not absolute union. If you put an appliance on to open the suture you do not open it, but you increase the development of bone in that region. That skull shows

there is development of bone in that region, but the development of that bone has closed the suture and made it tighter. The bone as developed has that mechanical stimulation to strengthen that particular thing. The bone is developed all around the entire superior maxilla, because if it did not, how in the world would the teeth have gotten tighter? As a result of that growth, going back to Dr. Barnes' statement, the suture is in a region where it cannot develop. I do not know what he means by that. He says that in these cases, where there is a lack of development of the upper arch, it occurs because the bone stops growing in the neighborhood of the suture. I cannot agree with him at all that the upper arch fails to develop because the bone stops growing everywhere around the whole thing. If you try to expand the arch by physiological tooth movement you produce growth of bone all over the alveolar process and produce mighty little in the immediate neighborhood of the suture.

Dr. Barnes. I have not disagreed with you in regard to that.

Dr. Casto. Is there any difference, in your opinion, between bone formed by mechanical stimulation and that formed naturally without any interference?

Dr. Dewey. My opinion is not worth a cent, because I have nothing to prove it. I do not believe that there is any difference. The whole skeleton is developed as the result of mechanical stimulation, and if you get mechanical stimulation to correspond with physiological stimulation you get the same amount of bone.

Retaining Appliances.

By William J. Brady, Kansas City, Mo.

Read before the American Society of Orthodontists, Chicago, July, 1912.

It must be admitted that the development of retaining appliances has not kept pace with that of regulating appliances. It is natural that the first efforts in orthodontia should have been directed toward the first part of the work—the moving of teeth—but we have now reached a place in orthodontia where attention should be given to the retention of teeth till that part of the work is brought up to the present high standard of regulating. Proper retention of teeth is even more important than their regulation, for while teeth *may* be moved by a very indifferent appliance,

yet they *must* be retained well or failure will follow even the most perfect result in regulation. Without doubt the next great practical field in orthodontia needing cultivation is that of retaining appliances.

This paper is not intended to cover the general field of retention and retainers, but only to formulate certain principles on which correct retention of the teeth is founded, and to consider some particular features of construction in retainers. None of these things is new, but they have been recognized in a more or less definite way for some time, though it is believed they have never been set forth connectedly before.

Dr. Edward H. Angie has given us the first great principle underlying retention, which may be stated as follows: Each regulated tooth tends to return to its old position, and that tendency must be counteracted in some manner until the tooth becomes firm in its new position. Thus a tooth that has been moved labially tends to move lingually back to the old place, or if it has been elongated tends to sink back in its socket, or if it has been rotated tends to rotate back again. The simple counteracting of these tendencies has been the chief consideration in retention until recently, but orthodontia has now reached a development which demands the recognition of other principles in addition.

An Important Principle in Retention.

For instance, no orthodontist, however skillful or fortunate, can so regulate a case that all the teeth will be in absolutely the exact relationship required in normal occlusion; there will always remain certain small adjustments of the teeth to their neighbors and to their antagonists, which can come only by these teeth working themselves into a complete final occlusion. If this adjustment is not made before the removal of the retaining appliance it is bound to occur after its removal, as teeth will not stay in any certain position unless occlusion holds them there, no matter what the retainer nor how long it is worn. This explains why the teeth fail to "stay put" in many cases. And retention is not complete in any case till the teeth are finally so adjusted to one another that the mechanics of occlusion will hold them in the proper position when the retaining appliance is removed. Hence, as a second principle of retention, the teeth should be free to adjust themselves into all the details of a complete and correct occlusion while they are counteracted from returning to their old positions.

Of course, it is not always possible to get entirely free movement of all the teeth during retention, but it should be secured as nearly as can be, and by planning especially for it this can be obtained oftener than is usually done. In allowing this free movement, however, the mistake must not be made of insufficient retention, such as occurs with, say, only two bands to support a soft metal bar in place to supposedly retain an

entire dental arch. This is just as undesirable as the other extreme of holding all the teeth entirely fixed.

There is another feature that must be considered in retention in the orthodontia of the present day. Not only must normal occlusion be gained, but normal conditions of all associated structures as well. The nasal opening must be widened and all obstructions removed that normal breathing may occur; the lining of the entire nasal and upper respiratory tract must be normal and not left hypertrophied nor with abnormal secretions; the lip function must often be restored; bad habits, such as lip-biting, etc., must be broken up; the relaxation of muscles during sleep (and thus promoting mouth-breathing long after the necessity for it has passed) must be counteracted and overcome; and actual development of bony tissue must be gained in many instances. All these things are really essential to retention, and to ignore them often means failure, fully as much as to neglect to hold the teeth properly. In fact, these side considerations are many times the most important features of real retention, therefore the necessity for establishing a third principle, as follows: All conditions contributory to producing malocclusion must be corrected as fully as the malocclusion itself.

Simplicity a Requisite.

There are other considerations in regard to retaining appliances, which, while they cannot be designated as principles, yet are features applicable to most cases. For instance, a retainer should not be difficult to construct. Retainers form a considerable part of an orthodontist's work, and he should not needlessly waste his time and energies on retainers of difficult pattern, when it has been abundantly proved that those of simple pattern will do the work and are preferable in every way. Practicability in construction should always be kept in mind in designing a retainer quite as much as any other feature, not only to save time and energy, but also because the chances are greater of getting a properly fitting appliance. As a first general feature, a retainer should be "makable."

As a second proposition, a retainer should be so constructed that it can be easily and quickly applied after it is made. Certain retainers have been proposed that are much like the steamboat the man built in his cellar—mighty hard to get where wanted after being made. Retainers should be so made that there is some assurance of success in cementing all bands in application. There must not be many bands to be applied at once, or some will surely fail of proper cementation. When bands are needed on the molars or bicuspids, clamp bands should be used rather than plain bands, and these bands should be detachable, thus allowing

the appliance to be put on in sections. This not only gives a chance for proper cementation, but makes it possible to apply a closer fitting appliance than when fixed anterior and posterior bands must be simultaneously applied to teeth whose crowns stand in widely diverging directions.

The comfort of the patient is no small item in putting on a retainer. Regulated teeth are always somewhat tender, and the application of a retainer may easily become a trying ordeal; in fact, many times the pattern of the retainer makes it decidedly painful. By use of a retainer put on in sections, the least pain possible is caused as well as the most perfect cementation. So we repeat the second rule, that a retaining appliance should be "put-onable" as well as makable.

As a third proposition, a retainer should be "take-offable" after being applied. This does not mean that it should be removable at the will of the patient, but capable of removal by the dentist without wrecking the whole appliance. It is taken for granted that a retainer fixed by cemented bands is the only kind to be seriously considered for general work. No other kind can really be depended on except for the simplest things, and even then the patient's disposition to wear a retainer is the thing depended on rather than the retainer itself. With most children this disposition is entirely too uncertain for any risk.

Frequent Removal Advocated.

But a fixed retainer should not be too fixed. It should be removed entire every three or four months, the teeth well cleaned and examined for any threatened decay, and then carefully recemented in place. Where there is a strong tendency to dental decay the retainer should be removed and recemented oftener. This removal is not hard, as cemented clamp bands usually peel from a tooth upon loosening the screw, and the cement can usually be broken and worked out from plain bands by means of small instruments like an explorer or a very small, thin spatula. This frequent removal gives a chance to make any changes desired from time to time, and allows a gradual elimination of parts, thus gradually releasing the teeth from the support of the retainer, a few at a time. This involves little risk, for if the occlusion fails to hold the released teeth it becomes evident in a very short time, when these teeth may be readily handled further and got into correct position, and then either retained longer or retained in a different way and still not jeopardise the whole case.

The application and removal of a retaining appliance should be as easy as the application and removal of a regulating appliance, otherwise proper attention to retention will hardly ever be given. When it takes from one to ten hours' time to remove and reconstruct a retainer, it is inevitable that such work will not be as frequent as it ought to be. But

with a sectional retainer, with either the whole or any particular part or band easily removed and as easily put back, proper attention to the whole matter of retention can be given with little trouble. And when a thing *can be* easily done it usually *is* done.

Construction of Retainers.

The construction of retaining appliances after the plans just discussed is, of course, open to many variations according to the conditions of the case and according to the individual preferences of the operator. When the dental arch has been expanded considerably, especially with lateral expansion extending back to the molar region, a stiff and close-fitting bar or arch on the lingual side of the teeth will be found the most satisfactory base for a retainer, this bar or arch being rigidly held in place by bands cemented upon appropriate teeth. By placing the supporting bands upon the proper teeth, usually the lateral incisors, and by means of proper spurs or bars on the labial side of these bands, a whole dental arch can usually be retained with about four bands. With the posterior bands adjustable and also detachable, the anterior part of the appliance can be put on first, with plenty of time for easy and proper cementation, the clamp bands being applied one at a time later on. A retaining appliance of this general pattern will be found applicable to a large percentage of cases, and very satisfactory in results, as it holds the teeth well in place while it gives them to a large degree the necessary freedom of movement during retention, and at the same time is easily made, easily applied, and easily removed.

The lingual arch should be round, to afford the least contact with the teeth and the least lodging place for food; a flattened lingual arch or semi-plate is undesirable. Either iridio-platinum or clasp metal containing a good percentage of platinum (Ney's preferred) is the best material for the lingual arch, as it must remain good and stiff after soldering up, enough so as to resist the inward tendency of not only the teeth, but the inward springing of a considerable quantity of quite elastic bone. The lingual arch should seldom be lighter than No. 16, American gauge, and often should be as heavy as No. 14. An arch of ordinary gold, or clasp metal with a small percentage of platinum, or any of the base metals, is practically worthless for the purpose.

The lingual arch should be fitted to a model of the case rather than to attempt to fit it in the mouth. It can be bent to fit with pliers perhaps easier than any other way, though it is not difficult to make a Melotte's metal model of the teeth and swage the arch to shape over this. It should be very accurately fitted by whatever method to be certain of good results. After it is either swaged or bent to shape the arch is ready to be soldered to the anterior supporting bands. This should be done upon

a model rather than to hold bands and arch together with pliers. The model should be of investment compound, and the arch bound down tightly to place with heavy iron binding wire. By soldering up directly on the model the arch and bands are always in proper alignment, a thing not always certain otherwise.

While only one form of the lingual arch appliance has been described, it must not be supposed that this is the only pattern of that useful device. There are many variations possible, but the writer wishes to touch only upon the general points of the appliance in this paper, pointing out also the fact that it is entirely according to the principles of retention that have been formulated, leaving a more detailed consideration to some future time.

Discussion on Paper of Dr. Brady.

Dr. D. Willard Flint, Pittsburgh.

This paper deals with generalities, and there is not anything new to attack. I quite agree with the author of the paper that in making attachments there is no better way than by working on models. The proper adjustment with retainers is what we are all seeking. As regards removing retainers every three or four months, I do not see the necessity of doing that if the bands are properly placed in the beginning and properly attached in between. I do not know whether Dr. Brady is placing bands under the free margin of the gum and festooning the same or not. If he is not, he will have occasion to look carefully after his bands. The only necessity for removing bands is when some accident has occurred, according to my way of thinking.

As regards the arch material, he speaks about using fourteen or sixteen gauge, but my experience has been in using iridio-platinum that we could not afford to use much fourteen gauge wire. I would fear some of my patients might die before I got it back again. I think the essayist must have a different kind of gauge to what we use in our town. I do not know whether he made a mistake in putting that in his paper or not.

Dr. J. A. Burrill, Chicago.

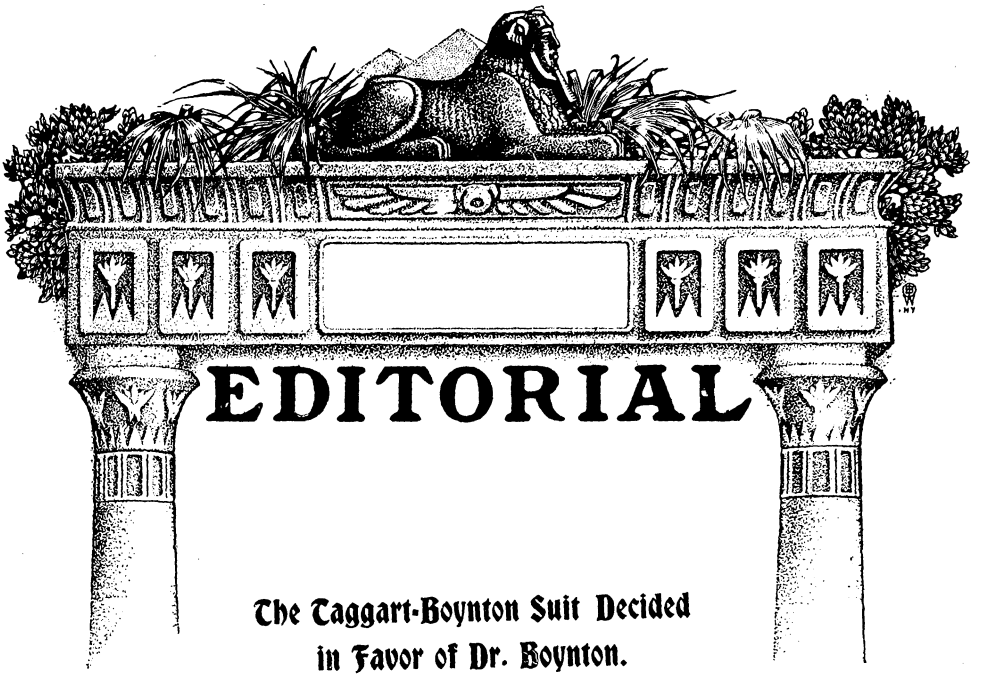
I agree with the essayist when he says that retention in orthodontia is not the simplest principle, but I was rather disappointed when he spoke so generally on the topic of retention and did not give us an improvement on anything we had used or known before. There are a great many things in connection with retention he has not considered, and one of these is the retention of open bites; and how long to retain the teeth. I have found it is absolutely impossible to judge how long to retain a rotated incisor, and I find after two years' retention

they will tend to go back even in apparently absolute and perfect occlusion. I do not think it is necessary to wait for absolute occlusion before we apply retainers. I find it advisable or advantageous very often to adjust a part of the retainer and make my little readjustments with that part of the retainer. He uses the lingual arch. I use it a great deal. I find sometimes when I want to put the lingual arch in place, if I were to make a metal die and swage an arch to fit that accurately, it would not be what I wanted. I cannot get things to settle into the perfect occlusion he tells us about.

He says that clamp-bands can be used on bicuspids and molars. There is a difference of opinion there. Clamp-bands are all right, and I use them almost entirely on molars, but never could find room for a clamp-band on a bicuspid in a retainer as well as a clamp-band on a molar. They are too cumbersome, and it is a little hard to fit a screw post to a bicuspid. In the retainers that have simplicity and efficiency, I do not think it is necessary to remove them every three or four months to cleanse the teeth. If they have simplicity and efficiency, you can discover decay without removing them. If the bands are thoroughly cemented in place, the teeth cannot decay under them. Cement adheres rigidly in my cases to the teeth and not to the bands.

I want to take some exception to the size of wire he uses in his lingual arch. I think such a large piece of clasp metal or German silver would be so cumbersome and so heavy as to render it absolutely impossible to make a fine adjustment to the teeth.

There are a great many things that confound us in the matter of retention. For instance, a thing that has bothered me is how to hold the bite closed when once it has been open and closed. How are you going to hold it closed? We have not the force of occlusion to hold it there. That is one feature of retention that has bothered me more than anything else. I flatter myself that I can put a tooth anywhere I want it, but I cannot always make it stay there. Even after I have retained it for a considerable length of time, it will not always stay.



EDITORIAL

The Taggart-Boynton Suit Decided in Favor of Dr. Boynton.

The object of this editorial is twofold. First to announce that the Taggart-Boynton suit, upon appeal from the judgment in favor of Dr. Taggart, has been decided in favor of Dr. Boynton. Second to state the facts as to the present status to our readers, that they at least may not be bamboozled by the conflicting and wholly erroneous tales which are in circulation. As for example, the writer has seen a statement to the effect that "The Supreme Court has decided that anyone may make cast inlays with any machine he may select." One could scarcely formulate a similar number of words into a single sentence containing so much misinformation.

First: The Supreme Court has made no decision whatever in this case, as it has not as yet been presented to the Supreme Court. The decision was given by the Court of Appeals of the District of Columbia.

Second: The Court has not decided that "Anyone may make cast inlays," because the question of making cast inlays was not before the Court. The patent under which the suit was brought covered "a process of making *patterns* for dental inlays," and "a process for making *molds* for casting dental inlays, etc."

Third: The Court has not granted any rights to anyone whatever, except to Dr. Boynton.

What the Original Suit Covered.

That the subject may be intelligible to our readers it may be explained that the original suit was a suit to *enjoin* Dr. Boynton from infringing a patent granted to William H. Taggart, which patent covered a method of making a pattern of a dental inlay, and a further method of making a mold for the pattern. No more than this was involved in this particular suit. The case was brought as a test case. It was brought in the District of Columbia because at that time an appeal from the first court could be taken to the Supreme Court of the United States. The law in this regard was altered pending the taking of testimony, and the appeal when made was carried to the Court of Appeals of the District. This decision therefore is binding only in the jurisdiction of that particular court. Finally, the suit was brought against Dr. Boynton wholly impersonally. There never was and is not now any ill feeling between Drs. Taggart and Boynton. The first decision was in favor of Dr. Taggart, but this has been reversed by the Court of Appeals, consequently the suit for an injunction against Dr. Boynton's using this process of making patterns and molds has been denied. Therefore Dr. Boynton now is legally at liberty to make a wax pattern of an inlay and to make a mold therefor.

The Court, however, has not decided that Dr. Boynton may proceed further and cast gold or other molten metal into that mold, and thus produce a cast metal filling, because Dr. Taggart has a patent upon that which was not before the court and consequently not open to decision by the court. Hence if Dr. Boynton should make a pattern for an inlay, and then make a mold about it, he would be within his rights; should he cast gold or other metal into that mold he would be as liable to a suit for infringement of Dr. Taggart's inlay patent as would any other. Moreover, the Court has not decided that citizens of other jurisdictions (other states) may utilize this process of making patterns and molds, because the Court of Appeals of the District of Columbia has no jurisdiction over the citizens of other states. Thus, should a citizen living elsewhere than in the District of Columbia, make dental inlay patterns and molds for the same, he could be sued for damages for infringement. If

Dr. Taggart should bring such a suit and perchance win it (a not unheard-of condition of affairs) then an appeal, perhaps, could be taken to the Supreme Court of the United States.

It is not at all likely that Dr. Taggart will pursue any such course because he has other patents which are much stronger than the one which the District Court decided against. Indeed, we are informed that Dr. Taggart has already brought two suits in Chicago which involve all of his patents, and it is expected that these may be brought to trial during the coming summer or early in the fall.

The Decision of the Court of Appeals, D. C.

We have not space in which to print the decision of the Court in full, but will here introduce a few excerpts, which make interesting reading. In an exceedingly astute, and remarkably well prepared brief which was presented by the lawyers in behalf of Dr. Boynton, we find these attorneys working for their client, Dr. Boynton, and not in the broad interests of the dental profession. To wit, we find them especially anxious to win the particular case in hand, to vacate the injunction against Dr. Boynton granted by the lower court. To this end they sought, and apparently found a technicality upon which they might win the right to introduce testimony which otherwise would not have been germane to the case.

What we all understand Dr. Taggart to have invented is a cast gold inlay. But when he applied for a patent the Patent Office directed that his claims be divided and that several patents be asked for. When following this injunction, and in preparing the patent upon making the patterns and molds, it seemingly occurred to Dr. Taggart's lawyers that this particular patent might be of use in other castings, and therefore instead of asking for a patent solely upon "dental inlay patterns" the words *"and the like"* were introduced.

These words were seized upon by Dr. Boynton's lawyers, who devote nine pages of their brief in exploiting this point. One or two quotations from the brief will make this clear, and it seems in the interest of all concerned that it should be made clear. The following paragraphs are quoted from the Boynton brief:

"And at the time that the application was presented, at the time when the asking mind and the granting mind had certain well-defined

conceptions of what was asked, there was no contemplation of limiting the alleged invention to so-called 'inlays,' or fillings for teeth. . . .

"Their present effort to interpret this as meaning an improvement relating to *one certain sort* of dental castings, fillings, or 'inlays,' is absurd when considered under the canons of interpretation. They now find that the subject-matter described in the patent itself is fully anticipated in the art and so are driven to say that they never meant to include *'bridges and the like';* that they never meant to include anything but 'inlays' and fillings.

"The very claims themselves in the patent in suit belie this later interpretation of what the intended description of the invention was. These claims say:

" 'What I claim as new and desire to secure by letters patent is:

" '1. The process of making patterns for dental inlays *and the like*. . .

" '2. The process of making patterns for dental inlays *and the like*. . . .

" '8. The process of making molds for casting dental fillings *and the like.*

" '9. The process of making molds for casting dental fillings *and the like.*

" '10. The process of making molds for casting dental fillings *and the like.'*

"What is the meaning of *'and the like'?* Turn back to the specification and see (lines 5, 6, 7, claim 1. p. 1 of specification, p. 378, Vol. II, Rec.):

" 'I have invented a new and useful improvement in methods for making molds for dental inlays *and the like*. . . .' "

That this argument by Dr. Boynton's counsel had weight with the Court is readily demonstrated by the following quotation from the Court's decision, which should be carefully read:

"An examination of these claims discloses that they do not cover, nor purport to cover, *a new process for filling teeth* [italics ours—Ed.]. On the contrary, they relate solely to the process of making *patterns* out of plastic material or wax and the process of forming a *mold* about such pattern, from which mold a duplicate of the pattern may be produced. The words 'dental inlays and the like,' as used in the claims of the patent when read in connection with the specification, as they must be read, clearly embrace 'bridgework and the like.' It is unnecessary here to determine whether they have even broader signification, although, as previously stated, the specification specifically includes 'certain other types of work of a fine grade.'

"To produce the pattern to which these claims relate, an impression in wax or other plastic material is obtained; that is to say, if a tooth cavity is to be filled wax is first inserted therein, chilled and removed. When thus removed a pattern of the filling has been obtained. Substantially, the same process would be followed in obtaining a pattern for a bridge between other teeth."

Thus it was that in this suit, which all of us supposed related to the making of *inlays,* much testimony relating to *bridgework* and *platework* which had been introduced by Dr. Boynton's witnesses was accepted by the Court as competent, and, indeed, the decision is practically based thereon, whereas in another trial, and in another jurisdiction all such testimony might be excluded. That the Court in this instance did take this view is borne out in the following extract from the decision:

"It is further conceded that the burnished inlay process was also well known for many years prior to the application for this patent. See Patent No. 402,352 to Robinson, dated April 30, 1889. In that process a piece of platinum or gold foil is placed in the tooth cavity and rubbed or burnished against the walls of the cavity. The foil, then called a matrix, is usually filled with wax so as to conform to the original shape of the tooth, then removed and precisely the same process followed as in the Taggart process; in other words, the only difference between the burnished inlay process and the Taggart process lies in the use of the foil, which subsequently fuses with the 'solder' or lower carat gold. The patent to Hollingsworth, No. 708,811, dated September 9, 1902, covers machines for casting dental bridges. The wax pattern in the Hollingsworth process is treated in substantially the same manner disclosed by the Taggart patent, and the casting process disclosed by Hollingsworth in no material way differs from that disclosed by Taggart. The patent to Reese, No. 200,760, dated February 26, 1878, covers a mold for casting dental plates. It is thus seen that it was old long prior to the Taggart patent to manufacture dental castings by the Lost Wax process."

Our intelligent dental readers may study this and decide for themselves whether this decision rests upon the merits of the case or upon a legal technicality.

It is only just, however, to state that the Court did have before it testimony in regard to at least one dental inlay, which was produced in evidence and which it was claimed had been made by casting. To this testimony and exhibit the Court alludes in the following language:

"Dr. Oscar H. Simpson of Dodge City, Kansas, a dental practitioner

since 1882, a graduate of the Ohio College of Dental Surgery, a member of the State Board of Dental Examiners, at one time president of the State Dental Association, and a member of the National Board of Dental Examiners, testified that he gave his first inlay clinic in about 1887, and had since given clinics at Topeka, Wichita, and Newton, Kansas, at the World's Congress of Dentists at St. Louis, and at other places. The witness described his progress in inlay work and further described, in detail, the method he employed in about 1898 to form a dental tip or crown for a boy by the name of Malcolm Judd. Without going into detail it is sufficient to say that the process described by the witness was substantially the process disclosed by the patent in suit. The original apparatus by which the process was practiced was introduced in evidence. Not only this but the original work, which had been subsequently removed after performing a useful purpose, was also introduced. While this piece of work was attacked by experts for the complainant we, nevertheless, are fully convinced that the process by which it was made was the process disclosed by the Taggart patent in suit."

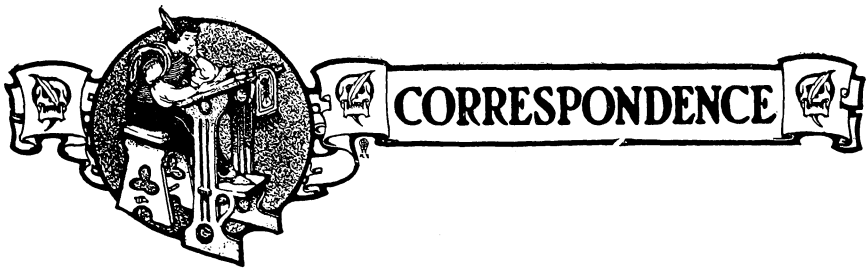
The "experts for the complainant" here mentioned are not unknown to the dentists of the country. They were Drs. Taggart, Goslee, Roach, Patterson, Crouse, and Bentley. It seems that the "inlay" itself was shown to Dr. Taggart, who declared it to be a tip for an incisor tooth, made by first forming a band around the tooth and completing with solder. This opinion was corroborated by the "experts" above named. And this was the only "cast gold inlay" actually exhibited as an example or product of an art which the Court declares has been proven to have been "well known." Vide the words of the decision:

"The contention in this case that Dr. Taggart's discovery was revolutionary in character is not sustained. On the contrary, as appears from the record art at the time Dr. Taggart applied for his patent, dental castings produced by the lost wax process were well known. Having this in mind, there is nothing improbable about the testimony of appellant's witnesses."

The Court declares that Taggart's invention was not revolutionary. Taggart disclosed his art of making cast gold inlays on January 15, 1907, in New York City. How many cast gold inlays had been made during the year prior to that date? How many cast gold inlays were made during the year following that date? Let the profession answer these two questions and determine whether or not Taggart's invention was revolutionary. However, we should not overlook that the Court says

that *"dental castings"* were well known, not that *"cast dental inlays"* were well known.

Dr. Boynton's lawyers appear to have found a weak spot, technically speaking, in this particular patent, and to have used it to validate the testimony by declaring that the patent, on its face, does not relate solely to inlays. We have gone into this matter at this length in order that our readers may know that Dr. Taggart has a patent (No. 983,579, which relates solely to the making of a dental inlay, and to the inlay itself) which has not been tested as yet. And we advise all who desire to act within the law to wait until this patent is declared to be invalid before concluding that "everyone is now at liberty to make dental inlays."



Dr. Taggart, His Patent Suit, and the Gold Inlay.

To the Members of the Dental Profession and Brothers:

The decision just rendered by the Court of Appeals, of the District of Columbia, declaring the Taggart inlay patents not valid, will be of great interest to the whole dental profession throughout the United States.

A former suit was brought by Dr. Taggart against Dr. Boynton, of Washington, in the District Supreme Court of Columbia, alleging infringement of his patent and was decided in Dr. Taggart's favor. The Appellate Court has just now reversed this decision and the bill of the patentee is to be dismissed. Justice Robb, of the Court of Appeals, holds that Dr. Taggart's patents are not valid and that he holds no monopoly on dental inlay work. This case was brought to test the validity of Dr. Taggart's patents, and was carried up to this court in order that the question might be definitely settled.

While this decision has been rendered against Dr. Taggart's patents, and while we do not feel that the patents were valid, we feel that the dentists of the United States, one and all, owe Dr. Taggart more than a debt of gratitude for the development of inlay work as used in the dental profession. We all must recognize the fact that had there not been a Dr. Taggart the dental inlay would not have reached the stage of perfection that it has to-day, and quite probably it would not be in general use at all. The fact that it might have been used and probably was used by individuals previous to Dr. Taggart's bringing it before the world, meant little or nothing to the dental profession. Dr. Taggart was the means of putting it in the hands of every dentist, and is rightly the father of gold inlays, inasmuch as he has educated the dental profession in both making them and using them, which no isolated practitioner who had not the name, the professional prominence or the ability which Dr. Taggart had, could have done. We believe that every dentist in the United States who is using gold inlays in his practice should contribute to a fund to reimburse Dr. Taggart for the time that he has

spent and the work that he has done in developing this process, because he alone deserves the credit.

The gold inlay has been the most important innovation in dentistry in many years. It has added or should add materially to the income of every dentist using it, and it saves a great deal of hard labor for us all. Think of the many hours laboriously spent in former years pounding in large gold fillings in similar cavities to those which we have in recent years filled so easily with the gold inlay. This saving of labor and increased returns we owe to Dr. Taggart and is what he should be reimbursed for.

Every dentist using the gold inlay who is not an owner of a Taggart casting machine should consider himself indebted to Dr. Taggart to the amount of at least $15, which is the sum for which the Dental Protective Association made an agreement with Dr. Taggart to furnish a license to its members, under his patents. Such sum would be no more than a fair recompense to Dr. Taggart and is certainly not burdensome to any of those who have profited as a result of Dr. Taggart's introducing the gold inlay to the profession.

It is to be hoped that Dr. Crouse, who already has the matter in hand for the Dental Protective Association, will take this up, or the various societies throughout the country could take it up, and in this way collect a fund which ought to be in proportion to the services rendered to the profession by Dr. Taggart.

Every man who does such a work as this should be reimbursed; the sum raised would be no hardship on even the most humble practitioner if divided among the dentists of the world, and would help establish the honor of the dental profession.

Let us all look the matter in the face and be honest with ourselves and pay for what we are profiting by.

CHAS. S. HARDY, D.D.S., Summit, N. J.

The above is published regardless of the fact that the writer somewhat misunderstands the effect of the Taggart-Boynton decision. Four or five years ago Dr. C. Edmund Kells, of New Orleans, sent us a similar proposition, with which, by the way, he enclosed his check for $100, but at that time we felt that it would be inappropriate to publish any suggestion of this character. Just at the moment, however, we feel that Dr. Hardy's letter should be published in order to test the extent to which the members of the dental profession realize their indebtedness to Dr. Taggart. We would be very glad to receive other communications on this subject.—EDITOR.

National Dental Association Scientific Foundation Fund.

The establishment of the Scientific Foundation Fund and Oral Research campaign of the National Dental Association, is being met by almost a landslide of professional support and endorsement. This in part is evidenced by the very liberal subscriptions made immediately upon the presentation of the plan. For example, when the work was presented by request before the Cincinnati Dental Society on January 24th, every member present contributed, making a total exceeding $2,500 or $500 a year for five years. Also when presented to a group of twenty dentists in Cleveland on January 28th, fifteen just ordinary dentists pledged $2,000 or $400 a year for five years. The full subscription from the society has not been taken as yet.

The number and urgency of the invitations from other places desiring to have the plan and the work presented there indicates that the spirit of the profession at this moment is intense to provide, by means of a general co-operation, for the bread and butter problem of some competent men that thereby they may enable them to devote their entire strength and undivided attention to the solving of some of the urgent oral and dental problems that humanity and the dental and medical professions are crying for a solution of.

Dr. Charles Mayo in closing his splendid paper before the recent dental meeting in Chicago, January 31st, under the auspices of the Chicago Dental Society, made the statement that: "It is evident that the next great step in medical progress in the line of preventive medicine should be made by the dentists. The question is: Will they do it?"

It is a remarkable fact that this oral group of diseases which afflict a larger percentage of humanity than any other, and which cause more total suffering directly and indirectly than any other, should have probably the least provision made for its competent exhaustive investigation aside from the private effort and independent sacrifice of individuals who have worked at night after days of exhausting professional toil. Practically all of the great epoch-making advances in medical science have been the result of definite laboratory research, and were only made possible by money being made available by a professional spirit back of it that was determined to know the unknown for the betterment of suffering humanity.

The eagerness to support this work financially, not as a mere sense of duty, but rather of privilege, scarcely exceeds the willingness of some of our best scientific institutions to place at the disposal of the National Dental Association, the free use of their laboratories and equipment in order that humanity may be the most speedily helped.

The committee has already had placed at its disposal, free of expense, facilities and equipment sufficient for a large staff of workers and these with an environment of experienced experts for consultation which money alone could not procure. The committee has found also to be available, some of the best qualified men in the various branches of oral and dental science, many of whom have an international reputation and whose hearts are known to the profession to be deeply devoted to the solution of these various great basic problems. All that is needed to bring this large group of earnest, competent men and these proffered laboratories together is an equivalent of $1 a year for five years from each member of the dental profession of the United States. Very many cannot be reached, others are too selfish to care, so that probably one-fifth of the profession will have to carry the expense, which will mean only $5 a year for five years and thus pay the dollar for the four others who cannot be reached. In the places named, many are offering to take care of twenty-four or forty-nine of the delinquents besides their own $1 part of the privilege.

A host of the profession have been longing and wishing for a way to do this seemingly imperative work for their profession and for humanity, but which they had not the time, the facilities, nor the money to do themselves. Now, by uniting our little but universal effort, we can with a very few cents each per year, provide for the maintenance of an expert investigator, including his competent assistants all working in one of these fine, well-equipped laboratories, and any of these many basic problems can there be attacked for a few cents from each of us.

The committee has available already all requisites *except the money,* for studying, exhaustively, the following problems: dental caries, its cause, prevention and means for its immunity; pyorrhea alveolaris (so called) and all peridental affections; systemic and distant infections having their origin in the mouth; erosion, its etiology and prevention; enamel atrophy, its cause and prevention; the metallurgical and physical problems such as substitutes for platinum and iridio platinum; dental alloys and amalgam; the physics of bridge construction and orthodontia, etc., etc. When this work is under way it will naturally be reported quite regularly through the *National Dental Journal.*

The committee has implicit confidence that ample endowments can be secured during the five years, to make the work permanent and extend and very much enlarge it.

This committee was created by the National Dental Association for organizing this new department and for the securing of the funds for its maintenance, and they expect to have a liberal fund available by the time of the National meeting in July at Kansas City and will report for

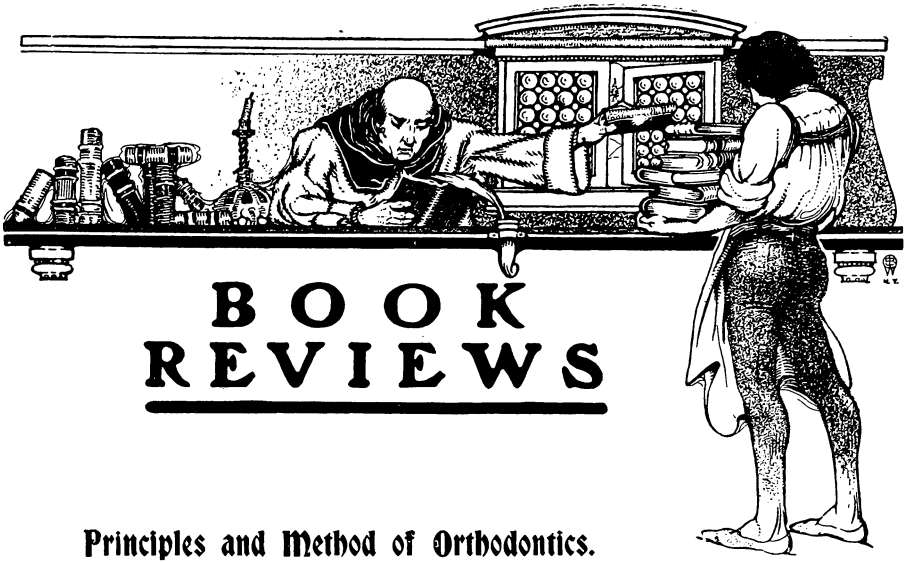
endorsement its progress and available facilities for proceeding with the work and will ask for a commission to be selected by that body, who shall assist in the great responsibility of establishing the work. This work does not in any way conflict with the special work being done by individuals at their own expense under the direction of another committee.

The funds are safely guarded by their being deposited with a trust company; the chairman of the committee is under bond and moneys can only be drawn over the endorsed voucher of the general secretary of the National. The committee has provided for a duplicate set of records of all payments to the fund to be kept by the General Secretary of the National Association.

Every organized dental society, city, county and State, should appoint a local committee on Scientific Foundation Fund and Research, with a local treasurer, who shall receive, receipt and forward all subscriptions to the National chairman, who will also receipt for the funds as received. The subscription forms are designed for a card system of bookkeeping and furnishes the following: a subscription form with provisions for receipting yearly payments on the original; the National chairman's receipt; the local treasurer's memorandum card for recording annual payments on pledges; a form to be sent to the National General Secretary for his duplicate record, the local treasurer's receipt and the local treasurer's remitting memorandum; the subscription forms will be furnished by the National chairman on application; also printed matter carrying both endorsements and earnest pleas from some of the noblest men in the profession; also a brief statement of the purpose and plan of the work.

Will *you* help the dental profession to establish this exhaustive oral research and thus have as a profession, the credit for the work, the control of the work and the consciousness of fulfilling in part our great obligation to society? If so, please send for subscription blanks and get busy at once.

WESTON A. PRICE,
Chairman Scientific Foundation Fund Committee.
10406 Euclid Ave., Cleveland, O.



BOOK REVIEWS

Principles and Method of Orthodontics.

An Introductory Study of the Art for Students and Practitioners of Dentistry, by B. E. Lischer, D.M.D., Professor of Orthodontics, Washington University Dental School, etc., illustrated with 248 engravings. Lea and Febiger, Philadelphia and New York, 1912. Price, $2.75.

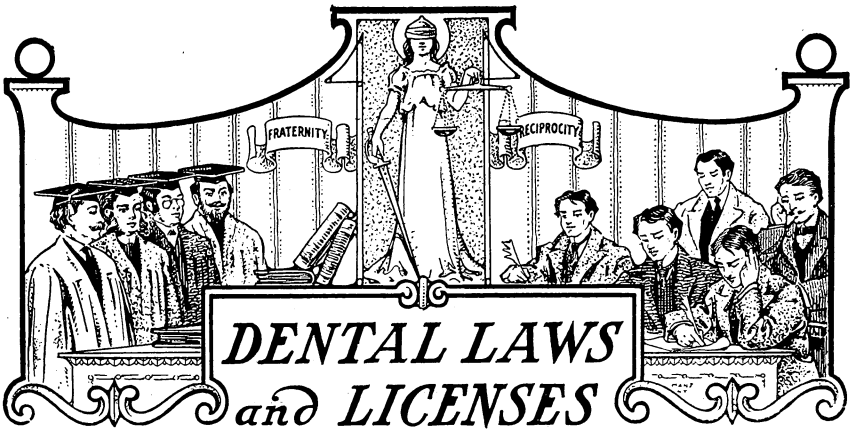
This book should be welcomed by the profession as a distinct advance in orthodontic literature. A perusal of its contents will satisfy the most extreme critic that the author possesses a wide range of knowledge of orthodontics in all its various branches. He recognizes the achievements of all who have ever contributed to the science and art, has no use for "schools," and approaches his task in true democratic fashion. He presents all those important facts which are now beyond question and indicates lines of advance for the future.

The volume comprises eighteen chapters as follows: I. The Study of Orthodontics, II. Preparing the Mouth for Treatment, III. Keeping Records of the Treatment, IV. The Etiology of Malocclusion, V. The Diagnosis of Malocclusion, VI. Facial Deformities Due to Malocclusion, VII. The Prognosis of Malocclusion, VIII. The Evolution of Methods. IX. Principal Elements of Modern Methods, X. Principles of Application, XI. Details of Application, XII. Principles of Retention, XIII. Treatment of Malposition, XIV. Treatment of Malposition (continued), XV. Treatment of Neutrocclusion, XVI. Treatment of Distocclusion, XVII. Treatment of Mesiocclusion, XVIII. Treatment of Malformation of the Jaws.

The historical phases of the art are carefully presented throughout the work and dealt with from the standpoint of modern historical method, viz., with the emphasis on principles and their gradual evolution.

But quite the best part of the work, aside from its practical value, are the many original suggestions regarding the fundamental conceptions of the science. Space forbids a detailed presentation of them here, hence the following brief outlines will suffice: (a) The present status of biological science, as is well known, forbids extreme statements regarding the inheritance of deformities. The author accordingly proposes a classification of etiologic factors into *Intrinsic* and *Extrinsic.* (b) In the field of diagnosis he proposes an entirely new terminology and emphasizes the importance of the subject, as well as portraying its historical development. The terms proposed are far in advance of any others in use. The writer of this review has had abundant opportunity as teacher and practitioner to test them and prefers them to all others. This advance, taken singly, is of the utmost importance, and fills a long-felt want. (c) The chapters on treatment are not only up-to-date in their technical aspects, but the division of the subject is likewise an improvement when compared with older texts. Several new terms are used here, such as *alignment wire* instead of *expansion arch; intramaxillary anchorage* to distinguish from *inter-* and *extramaxillary* anchorage, etc. (d) The subject of retention is handled in a brief but masterly fashion. The term *post-treatment maintenance* is here introduced for the first time and shown to be superior to *retention.* Strictly speaking "retention of malocclusion" would mean the retaining of the deformity, e. g., retention of pus, or urine. Dr. Lischer classifies the subject into (1) Maintenance of tooth-position, (2) Maintenance of arch-form, and (3) Maintenance of arch-relation. It seems to the writer that this is quite the most concise and practical division of post-treatment problems ever proposed.

The presentation of cases treated by the author is comprehensive, covering a large number of types. The illustrations are quite above the average, giving the volume an attractive appearance. It should not only be in the library of every dentist, but merits the adoption as a text-book by all teachers and students. M. N. F.



Navy Reserve Corps Established by Congress.

Provided, That a Navy Dental Reserve Corps is hereby authorized to be organized and operated under the provision of the act approved August twenty-second, nineteen hundred and twelve, providing for the organization and operation of a Navy Medical Reserve Corps, and differing therefrom in no respect other than that the qualification and requirements of the appointees shall be dental surgeons and graduates of reputable schools of medicine or dentistry instead of "graduates of reputable schools of medicine," and so many of said appointees may be ordered to temporary active service as the Secretary of the Navy may deem necessary to the health and efficiency of the Navy and Marine Corps, providing the whole number of both regular corps and reserve corps dental surgeons in active service shall not exceed in time of peace, one to each one thousand five hundred of the said personnel, and no dental surgeon shall render service other than temporary service until his appointment shall have been confirmed by the Senate:

Provided Further. That Dental Corps officers of permanent tenure shall be appointed from the Dental Reserve Corps membership in accordance with the said provisions in the said act, and all such appointees shall be citizens of the United States between twenty-two and thirty years of age, of good moral character, of unquestionable professional repute, and before appointment shall pass satisfactory professional and physical examinations, and when appointed shall take rank and precedence in the same manner in all respects as in the case of appointees to the Medical Corps of the Navy and shall receive corresponding pay and allowances and, when they reach the age of sixty-four years, be entitled to retired pay.

United States Supreme Court Sustains Constitutional Right of States to Enact Dental Statutes.

By PERCY W. GARDNER, of Wilson, Gardner & Churchill, General Counsel for the State Board of Registration in Dentistry of the State of Rhode Island.

States of Rhode Island vs. Evan B. Rosenkrans*.

While a number of the final courts of appeal in the various States have held that a law regulating the practice of dentistry and creating a board of examiners in dentistry is constitutional, the first case to be passed upon by the Supreme Court of the United States is that of State vs. Rosenkrans, decided by the Supreme Court on June 7, 1912. This case, which had been fought through the courts of Rhode Island and in the federal courts for over three years, and in which almost every possible constitutional question concerning the practice of dentistry was raised, will be of interest both to the members of the dental profession and to counsel for boards of dentistry throughout the country.

On August 12, 1909, Harry L. Grant, secretary of the Board of Registration in Dentistry of the State of Rhode Island, swore out a complaint in the District Court of the Sixth Judicial District of that State, against one Evan B. Rosenkrans, alleging that he did practice and attempt to practice dentistry without having first received a certificate from the Board of Registration in Dentistry that he had passed a satisfactory examination with reference to his knowledge and skill in dentistry. This complaint was brought by Doctor Grant upon the strength of the following statutes:

> Section 4 of Chapter 181 of the General Laws of Rhode Island, 1909, which is an enactment of Public Laws 470, May 21, 1897, provides that all persons who hereafter intend to enter the practice of dentistry in this State shall appear before said board and be examined with reference to their knowledge and skill in dentistry, and to such as pass a satisfactory examination certificates to that effect signed by the president and secretary of the board shall be issued, and thereupon the names of such persons receiving certificates as aforesaid shall be registered with said board.
>
> Section 7 of the same chapter makes the practicing without first obtaining such a certificate a misdemeanor.

*The first case to be passed upon by the Supreme Court of the United States determining the constitutionality of a law regulating the practice of dentistry.

Section 9 of this chapter permits members of the Board of Registration in Dentistry to swear out complaints.

The defendant was tried in the District Court, convicted and took an appeal to the Superior Court.

In the Superior Court the defendant filed on October 12, 1909, a special plea in bar alleging that he held a certificate from the State Board of Registration in Dentistry of the State of New Hampshire and a certificate from the State Dental Commissioners of the State of Connecticut, certifying that he was competent and fit to practice dentistry, which certificates he received from said boards several years before the time alleged in said complaint and warrant, and that he held licenses to practice dentistry in both of said States, and that he had further been in the continuous and successful practice of dentistry for the period of about twenty-six years prior to the bringing of the complaint; that evidence of the existence of such certificates and of the length of time that the defendant had practiced was presented to the State Board of Dentistry for the State of Rhode Island by the defendant in the form of a sworn petition, demanding a license, before said complaint was sworn out, and that he was practicing dentistry in Rhode Island before there was any legislation in the State regulating the practice of dentistry therein. To this special plea the complainant demurred on the ground that such pleas were not sufficient in law to preclude the complainant from having an action against the respondent. Upon argument this demurrer was sustained by the Superior Court.

The respondent was then permitted before trial to file certain constitutional questions, and which constitutional questions were certified under statutory powers to the Supreme Court for the State of Rhode Island, the court of last resort in that State, for determination. The seven questions thus raised and certified were in effect as follows:

1 and 2. Is this statute in conflict with Section 10 of Article 1 of the Constitution of Rhode Island and Section 1 of Article 4 of the Constitution of the United States in that it deprives the defendant of the right to continue to practice dentistry in the State of Rhode Island, which right of property he enjoyed before the enactment of the statute?

3. Whether this statute is in conflict with Section 2 of Article 4 of the State Constitution vesting all legislative power in the general assembly, whereas the general assembly has granted legislative power to the examining board?

4. Is this statute in conflict with Section 2 of Article 4 of the Constitution of the United States in that it denies to citizens

of another State coming into this State the privilege and immunities of citizens of this State?

5. Is it in conflict with Section 1 of Article 14 of the Constitution of the United States in that the defendant is deprived of the privilege or immunity as a citizen of the United States, which he enjoyed before the passage of this act?

6. Is it in conflict with Section 1 of Article 4 of the Constitution of the United States in that it denies to each and every State the full faith and credit required to be given to public acts of each State?

7. Seven was a restatement of question two.

In the opinion handed down March 9, 1910 (see 30 R. I., 374), written by Mr. Chief Justice Dubois, and which discusses each of these questions in a full and exhaustive manner, each of these questions was answered in the negative, thus sustaining the constitutionality of this statute as far as the State courts were concerned.

Pursuant to the decision on the constitutional questions, the case was remitted to the Superior Court for the State of Rhode Island for trial. The defendant was tried and found guilty. A motion for a new trial was made and denied.

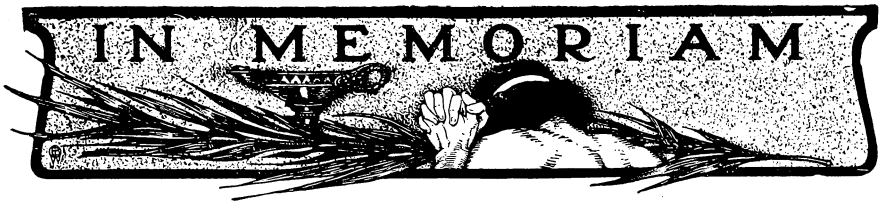
The case was then taken to the Supreme Court on exceptions raised during the trial and exceptions to the denial of the motion for a new trial, all of which exceptions were overruled and the case remitted to the Superior Court for sentence.

The defendant then filed with the United States Supreme Court a petition for writ of error, which petition was granted by Mr. Justice Holmes on June 5, 1911, and was served upon a justice of the Superior Court on the day on which the defendant was brought before the court for sentence. This writ of error carried the entire record of the case to the United States Supreme Court, and placed before the United States Supreme Court the questions involving the constitutionality of the State statutes as far as they were in conflict with the Constitution of the United States.

The complainant's attorneys during the October term, 1911, of the Supreme Court of the United States filed a motion to dismiss the case for want of jurisdiction and to affirm the judgment of the State court. This motion raised two questions: namely, whether the writ of error was prematurely or improperly brought, and secondly, whether the federal questions involved were frivolous, and therefore the judgment of the State court should be affirmed without further hearing in the United States Supreme Court.

As above stated, this motion was granted by the United States Supreme Court on June 7th, thereby determining that the constitutional questions involved were frivolous and that the judgment of the lower court should be affirmed.

The opinion written by Mr. Chief Justice Dubois in the State Court analyzes with great care the entire statute, and all of the constitutional questions, and should form a valuable precedent for any State having a similar statute, where the constitutionality of the statute is raised, and since the case was carried to the United States Supreme Court on the constitutional grounds above enumerated the possibility of a successful appeal in any other State having a similar statute has been finally disposed of.



Norman William Kingsley, M.D.S., D.D.S.

Dr. Norman W. Kingsley died February 20, 1913, at his home in Warren Point, N. J. He had been ailing for about two weeks from what at first appeared to be a simple cold, but day by day he grew weaker, until at last it was realized that the end was approaching. He was the first to comprehend this. and it seemed to make him very happy, as he said he was very tired and needed a long rest. He dictated letters up to the day of his death, giving names and addresses of those to whom he wished special messages sent. His final death is thus beautifully described by the woman who had long and loyally attended him—"So sweet was the end, so peaceful and contented the look on his face, that although I miss him as I would my child, I would not have the heart to want him back in this world of sin—not even for an hour."

Norman William Kingsley, M.D.S., D.D.S., of New York City, was born in St. Lawrence County, New York, October 26, 1829, and was a son of Nathaniel and Eliza (Williams) Kingsley. He was married in 1850 to Miss Alma W. Shepard, daughter of the Rev. Silas E. Shepard of Troy, Pennsylvania. The first ancestor of the name of Kingsley was Ranulph, a Saxon, appointed in the reign of Henry II of England (1166) keeper of the forest of De-la-Mere, and from the king's lea upon which he lived the family took its name. A descendant, John Kingsley, emigrated to America, landing at Dorchester, Mass., in 1634. A descendant of the English branch of the family was the celebrated author, Charles Kingsley, Canon of Westminster, who died in 1875.

Amos Kingsley of the fourth generation in this country was a tanner in Windham County, Conn., and five generations after him followed the same occupation, first in Bershire County, Mass., then in Rutland County, Vt., and now in Tioga County, Pa. Nathaniel Kingsley, born in Pittsford, Vt., removed to St. Lawrence County, New York, where Norman was born, but, after a few years returned to his native place, and in 1842 removed to Troy, Pa., and lived upon a farm. Norman received his education in the Troy Academy and at fifteen years of age was a clerk in a store in Elmira, N. Y., upon a salary of one dollar per week and his board, where he remained over three years. Subsequently he

became a student of dentistry under his uncle, Dr. A. W. Kingsley, of Elizabeth, N. J. In October, 1850, he began practice in Owego, N. Y., and in May, 1852, became a partner of Dr. Solyman Brown, on Washington Square, New York City. Dr. Brown was a man of distinction in his day; a graduate of Yale, an author, editor, artist and poet of no mean ability. Dr. Brown was attracted to Dr. Kingsley by some carved porcelain block teeth mounted on gold, which the latter had made, and which he regarded as superior to anything he had seen.

Dr. Kingsley was awarded the highest prize at the World's Fair, held in the Crystal Palace, New York, in 1853, for the best imitation of natural teeth carved in porcelain. He also received the first prize at the Paris exposition in 1855 and like awards in other places where he exhibited. In that day it was not considered unethical for a dentist to display in competition examples of his methods and skill. In 1864 he went abroad and was received with distinction by the medical and surgical societies and the Odontological Society of London and in Paris by the French Academy of Medicine, before each of which he read essays. In 1865 he returned to New York, and in that and the following year organized the New York College of Dentistry, of which he was Dean and Professor of Dental Art and Mechanism for three years. In 1867 he published a series of monographs entitled "Dentistry as a Fine Art." He was one of the founders of the New York State Dental Society in 1868 and twice president of the same. He was president of the New York State Board of Dental Censors for sixteen years, and formerly a member and president of the First District Dental Society and of the New York Odontological Society. He was an honorary member of the American Dental Society of Europe, the Odonto-Chirurgical Society of Scotland, the Odontographic Society of Philadelphia, the International Medical Congress (London, 1881) and many others. At the instance of the New York Dental Society, Dr. Kingsley went unaided and alone to the State Legislature and secured the passage of the law exempting dentists of New York City from jury duty.

His world-wide renown in the treatment of congenital cleft palate for the cure of defective speech began in 1859. A gold medal was awarded him by the American Dental Convention at Saratoga in 1863, and another gold medal by the Odontographic Society of Pennsylvania the same year. The Baltimore Dental College conferred upon him a special degree for "Scientific investigation of congenital deficiencies of the palate and by the application of a very remarkable artistic skill to the artificial replacement of the same, has demonstrated the high capabilities of dental art and has rendered invaluable service to this unfortunate class of sufferers." This appliance was unique and original with Dr.

Kingsley, and has perfected the speech of many people all over the world. Before the Odontological Society of London, in 1864, Sir William Pollock, surgeon-in-chief to St. George's Hospital, said: "As one who takes some interest in the question of congenital cleft palate, I consider it my duty to rise to pay my tribute of respect and admiration to Dr. Kingsley for the very eminently practical and ingenious apparatus which he has brought before us this evening. I look upon it as one of a series of those very great improvements that have come from the other side of the Atlantic which have conferred so much benefit on mankind." At a meeting of the French Academy of Medicine in 1865, M. Nelaton, the most distinguished surgeon of his generation, said: "I want to congratulate Dr. Kingsley on having succeeded where surgery has heretofore failed. It is a coincident fact that the first operation upon a cleft palate was done by a French dentist, but it has been left for an American dentist to discover a means whereby the speech of these unfortunate people can be benefited and they are no longer deprived of social intercourse."

Dr. Kingsley became practically identified with orthodontia in the earliest years of his practice, his first contribution to any journal being in 1857 on that subject. From 1872 to 1876 he undertook an extensive investigation into the causes of such irregularities, in the pursuit of which he made personal examinations of thousands of children in public schools, asylums and other institutions in this country and Europe. His monograph on that subject, read before the New York Odontological Society, was subsequently embodied in his "Treatise on Oral Deformities," published by the Appletons in 1880. This work was mainly devoted to orthodontia and cleft palate appliances, and was translated into German, his teachings upon those subjects forming the basis of all subsequent writings. But while the doctor was an enthusiast in the two specialties described, he was not to be regarded as only a specialist. No patient who ever went to him with a trouble that dentistry could remedy was sent away by being told: "That is not in my line." To him dentistry is not so vast a field that one person cannot master the whole of it.

During this period the conservation of the teeth as an art had reached its highest attainment. The living organs, when decayed, could be restored and their usefulness prolonged indefinitely, but frequently at the expense of their beauty. Esthetics was entirely ignored and broken-down teeth were further disfigured by the display of gold in violation of all good taste. During the last decade of the nineteenth century Dr. N. S. Jenkins, of Dresden, brought forward his "Porcelain Enamel," and Dr. Kingsley, who was his intimate friend, became its ardent disciple and was one of the first to introduce it into America.

In his more than half a century of active practice he originated many of the methods now in common use. He invented and patented, in 1866, the first portable gas blow pipe and none of the modifications or alleged improvements which have appeared since, equal the original invention. Dr. Kingsley was a many-sided man, as a lecturer, an author, a dental surgeon and an artist. He has been called "The Admirable Crichton" of the dental profession. As a public speaker he was fluent, forcible and aggressively earnest in advocating any cause which he espoused. As an author his writings are classic, and as an artist he was self-taught in every branch which he undertook. In his childhood in Vermont, before he was ten years of age, he was whittling out miniature sawmills to be run by the water from an adjacent rivulet. While in a store in Elmira he picked up, without previous instruction or knowledge, wood and copperplate engraving which was done so skillfully that he achieved the distinction of being described in the local newspaper as a "genius" and a "prodigy." This incident reveals clearly traits in the character of the boy as developed in the years that followed. He was never more contented than when doing something with his fingers. He embellished the store ledger with fancy lettering. He had a fondness for art, but the opportunities for gratification in the country at that time were exceedingly limited. He could understand how a painter with colors and a brush could produce a picture, but how pictorial effects could be obtained by engraving was incomprehensible, and therefore a picture made from a copper plate required, in his estimation, a higher order of talent than the painter's. He also had the self-reliance which told him that anything that anyone could do with his fingers he could do. When, therefore, he saw the print of a seal which was engraved by a fellow-townsman on copper for a local lodge which represented a military encampment, immediately that engraver was exalted to the gods in his eyes, and he had the ambition to do one like it, although at the time he was in such ignorance of the technique that he did not know the simplest rudiments, not even what a burin was. Nevertheless, he borrowed one from a jeweler, and with a piece of copper obtained from a tin-shop he essayed to engrave a seal for a club which the boys had established. After one or two failures he was gratified by being told that it was fully equal to the one that had excited his ambition.

While a student with his uncle in Elizabeth he made a portrait bust of his preceptor, carving it out of plaster, not knowing at the time that the sculptor made his initiative in a more plastic material. After that he took up as an avocation modeling in clay and executed numerous bas-reliefs and full figures, both portrait and ideal, in marble and bronze. An idealized portrait in marble modeled in 1861 called "The Evening

Star" has been very much admired. In 1868 he produced in marble a bust of the Saviour which has commanded universal admiration from the critics and the public. Of it the New York *Observer* said: "Viewed as a work of art had it been produced by any of the distinguished sculptors of our own or foreign countries, it would challenge the admiration of the critical, but it is certainly more extraordinary that such a splendid production should come from the hands of one who has never pursued the art except as a pastime. . . . It is a serene and majestic head with all that is grand and nothing that is harsh, with all that is tender and nothing that is weak. It impresses the beholder with a profound sense of the two great elements which blend so beautifully in the man Christ Jesus—Strength and tenderness."—Rev. Dr. E. P. Rogers. A steel engraving of this head forms the frontispiece of Dr. Howard Crosby's "Life of Christ." One of his best portraits is a bronze bust of the Hon. Whitelaw Reid, for many years editor of the New York *Tribune* and twice Ambassador to England. This was presented to the Lotus Club, of which Mr. Reid was then president and Dr. Kingsley one of the directors.

In later years he invented a modification of the blow-pipe, patented in 1866, and with its flame which could be graduated to the delicacy of a camel's-hair pencil he could produce by burning on wood all the varying shades from a faint sepia to a coal-black tint, and in this manner he made quite a gallery of copies of Rembrandt's works, principally portraits, of which it has been said by artists that they better represent the characteristics of Rembrandt than has been accomplished with any other medium. The process, which is unique, is not to be confounded with pyrography or *poker work* as it is sometimes called.

In April, 1900, he was the recipient of a banquet tendered him by his colleagues in commemoration of the completion of his half century of dental practice. Prominent men from nearly a dozen States journeyed to the metropolis to share the honor of doing homage to Dr. Kingsley. The after-dinner speakers vied with one another to express their admiration for this many-sided man. The menu was a fitting souvenir of the occasion, being embellished with copies of Dr. Kingsley's Rembrandt reproductions, of his bust of the Saviour, and of a speaking likeness of himself which he had made in bas-relief.

New York State has produced many of the pioneers and leaders in dentistry, but it is safe to say that no one of them all has done more than Dr. Kingsley for the real elevation of his profession. By his talents he has shown that the highest type of dentist is a composite being; a master mechanic; both an artisan and an artist; a professional man and a scholar; and above all, a Christian gentleman. And no more fitting

epitome of Dr. Kingsley can be phrased than to say that in his own life he has embodied all of these. R. O.

Dr. H. A. Hull.

Died at his home, 42 Bayard Street, New Brunswick, N. J., March 5, 1913, of pneumonia, in his eighty-second year.

Dr. Hull was born at Columbia, Pa., October 19, 1831, and was the oldest of four sons. He married Catherine S. Merrill, of Millstone, N. J., who died May 31, 1893. Four sons were born to them, none of whom survived. An adopted daughter brightened their home for several years until death claimed her in his declining years, leaving him quite alone. In spite of this, Dr. Hull owned a genial sunny disposition which won him many friends to whom he very seldom unburdened his disappointed and lonely life, but made the best of his surroundings. He was a great traveler and a fund of stories of his adventures was always at his command, the doctor being a keen observer and capable of relating his experiences in the most fascinating manner.

The deceased traced his genealogy back to George Hull, ancestor of the Hulls, of Fairfield County, Conn., who sailed from Plymouth on the ship *Mary and John* and arrived May 30, 1630, at a place on Nantasket, afterward called "Hull" in honor of Joseph Hull, brother of George Hull. His paternal great-grandfather was Jedediah Hull, prominent in military record of the invasion of Canada, in 1758, and during the Revolution.

At the early age of thirteen years he left school to clerk in his father's store, and at the age of eighteen, becoming interested in dentistry, placed himself under the tuition of Dr. James F. Stratton, of New York City. In the early part of 1852 he engaged as an assistant to A. D. Newell, M.D., of New Brunswick, N. J., who was at that time one of the most skilful dental surgeons of the State. Two years later he opened an office in Rahway, N. J., practicing there until the outbreak of the Civil War, when he was moved by the spirit of his ancestors and enlisted in the Eleventh Connecticut Volunteers, being mustered into service, October 30, 1861. He was soon promoted to be corporal of Company I and subsequently transferred to Company D as first sergeant; later he was clerk in the adjacent general's office at Richmond, Va. After serving two years of his first term, he re-enlisted for three years, and was mustered out of service on December 21, 1865.

After the war Dr. Hull again associated himself with Dr. A. D. Newell, who was associated with Dr. E. W. Robbins, having an office in the National Bank of New Jersey Building. After the retirement of

Dr. Newell and the death of Dr. Robbins, he associated himself with Dr. James G. Palmer, who, after several years of association, sold his interests to Dr. Harvey Iredell, who became a partner to Dr. Hull. A few years later his partner purchased the practice which had been in existence for forty years. Dr. Hull then formed a partnership with Dr. W. D. Rice and carried on the practice at his dwelling until his death.

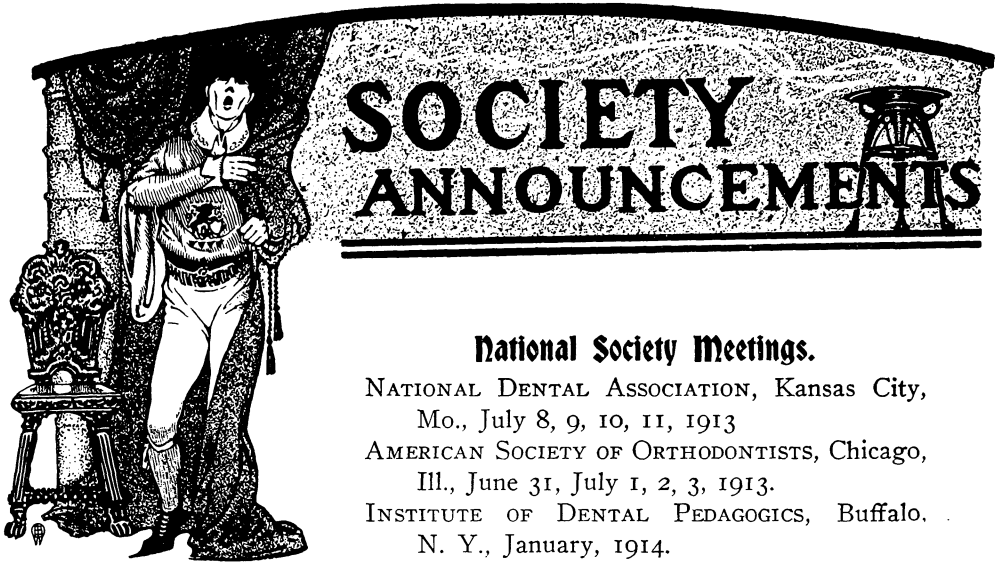
During his association with the old office, many men who have since become prominent in the field of dentistry were connected there, including S. H. Guilford, now dean of the Philadelphia Dental College and the Dental Department of the Temple University, of Philadelphia, Pa., Dr. J. D. Thomas, of Philadelphia, specialist in extracting and the late Dr. James G. Palmer, of New York, a specialist in operative dentistry. He had always numbered many of the best citizens of the county among his patrons.

Dr. Hull was a staunch Republican and served this city in an official capacity for several years. He was a Scottish Rite Mason, as well as a Knight Templer, member of the Mystic Shrine and was past presiding officer in several of its bodies. He was past president of the Central Dental Association of Northern New Jersey and the New Jersey State Dental Society, and was the treasurer of the State Society until last summer, when he resigned. He was a Fellow of the American Academy of Dental Surgery of N. J., member of Boggs Janeway Post G. A. R. and many other organizations at the time of his death.

A good man and a true friend has fallen, and while those of us who knew him well keenly feel his loss, yet we cannot but rejoice in his splendid record of achievement covering a long and useful life.

HARVEY IREDELL,
FRANK L. HINDLE,
HERBERT S. SUTHEN,
CHAS. F. JONES,
EDWIN W. HARLAN,
Committee.

Central Dental Association of Northern New Jersey.



National Society Meetings.

NATIONAL DENTAL ASSOCIATION, Kansas City, Mo., July 8, 9, 10, 11, 1913

AMERICAN SOCIETY OF ORTHODONTISTS, Chicago, Ill., June 31, July 1, 2, 3, 1913.

INSTITUTE OF DENTAL PEDAGOGICS, Buffalo, N. Y., January, 1914.

State Society Meetings.

ARIZONA DENTAL SOCIETY, Phœnix, Ariz., November, 1913. Secretary, Dr. H. H. Wilson, Phœnix, Ariz.

ARKANSAS STATE DENTAL ASSOCIATION, Little Rock, Ark., April 7, 8, 9, 10, 11, 1913. Secretary, Dr. I. M. Sternberg, Ft. Smith, Ark.

CALIFORNIA STATE DENTAL ASSOCIATION, Oakland, Cal., June 2, 3, 4, 5, 1913. Secretary, Dr. E. E. Evans, Oakland, Cal.

CONNECTICUT STATE DENTAL ASSOCIATION, Waterbury, Conn., April 15, 16, 1913. Secretary, Dr. A. V. Prentis, New London, Conn.

GEORGIA STATE DENTAL SOCIETY, Columbus, Ga., June 12, 13, 14, 1913. Secretary, Dr. DeLoss L. Hill, Grant Bldg., Atlanta, Ga.

ILLINOIS STATE DENTAL SOCIETY, Peoria, Ill., May 13, 14, 15, 16, 1913. Secretary, Dr. H. L. Whipple, Quincy, Ill.

INDIANA STATE DENTAL ASSOCIATION, Indianapolis, Ind., May 20, 21, 22, 1913. Secretary, Dr. Otto U. King, Huntington, Ind.

KENTUCKY STATE DENTAL ASSOCIATION, Lexington, Ky., May 26, 27, 28, 1913. Secretary, Dr. C. R. Shacklette, The Atherton, Louisville, Ky.

MAINE DENTAL SOCIETY, Portland Harbor, Me., June 25, 26, 27, 1913. Secretary, Dr. I. E. Pendleton, Lewiston, Me.

MASSACHUSETTS DENTAL SOCIETY, Boston, Mass., May 8, 9, 10, 1913. Secretary, Dr. A. H. St. C. Chase, Everett, Mass.

MICHIGAN STATE DENTAL SOCIETY, Grand Rapids, Mich., April 10, 11, 12, 1913. Secretary, Dr. F. Ward Howlett, Jackson, Mich.

MINNESOTA STATE DENTAL ASSOCIATION, Secretary, Dr. Benjamin Sandy, Syndicate Bldg., Minneapolis, Minn.

MISSISSIPPI DENTAL ASSOCIATION, Meridian, Miss., June 24, 25, 26, 1913. Secretary, Dr. L. B. Price, Corinth, Miss.

MISSOURI STATE DENTAL ASSOCIATION, Kansas City, Mo., July, 1913. Secretary, Dr. S. C. A. Rubey, Warrensburg, Mo.

NEBRASKA STATE DENTAL SOCIETY, Omaha, Nebr., May 19, 20, 21, 22, 1913. Secretary, Dr. Wm. A. McHenry, Nelson, Nebr.

NEW YORK STATE DENTAL SOCIETY, Albany, N. Y., May 8, 9, 10, 1913. Secretary, Dr. A. P. Burkhart, 52 Genesee St., Auburn, N. Y.

NORTH CAROLINA DENTAL SOCIETY, Winston-Salem, N. C., May 28, 29, 30, 1913. Secretary, Dr. J. M. Fleming, Raleigh, N. C.

NORTH DAKOTA DENTAL ASSOCIATION, Fargo, N. Dak., May 16, 17, 1913. Secretary, Dr. E. N. Hegge, Hatton, N. Dak.

PENNSYLVANIA STATE DENTAL SOCIETY, Philadelphia, Pa., June 24, 25, 26, 1913. Secretary, Dr. L. M. Weaver, 7103 Woodland Ave., Philadelphia, Pa.

SOUTH CAROLINA STATE DENTAL ASSOCIATION, The Isle of Palms, June 25, 26, 27, 1913. Secretary, W. Busey Simmons, Piedmont, S. C.

TENNESSEE STATE DENTAL ASSOCIATION, Nashville, Tenn., June 5, 6, 7, 1913. Secretary, Dr. C. O. Rhea, Nashville, Tenn.

TEXAS STATE DENTAL ASSOCIATION, Temple, Texas, May 15, 16, 17, 1913. Secretary, Dr. J. G. Fife, Dallas, Texas.

VERMONT STATE DENTAL SOCIETY, Burlington, Vt., May 21, 22, 23, 1913. Secretary, Dr. P. M. Williams, Rutland, Vt.

VIRGINIA STATE DENTAL SOCIETY. Secretary, Dr. C. B. Gifford, Taylor Bldg., Norfolk, Va.

WISCONSIN STATE DENTAL SOCIETY, Madison, Wis., July 8, 9, 10, 1913. Secretary, Dr. O. G. Krause, Wells Bldg., Milwaukee, Wis.

Southern Branch National Dental Association.

The fifteenth annual meeting of the Southern Branch of the National Dental Association will be held at the Chamberlin Hotel, Old Point Comfort, Va., July 22d to 25th, inclusive. The Virginia State Dental Society will hold its meeting conjointly with the Southern Branch at that time.

THOS. MOORE, JR., Corresponding Sec.,
Southern Branch National Dental Association.

National Dental Association.

The 1913 session of the National Dental Association will be held in Kansas City, Mo., July 8th to 11th. The local committee of arrangements have selected the Baltimore Hotel as "Headquarters" and made the other necessary arrangements for this meeting. The officers and committees are planning to present an exceptionally interesting program, the details of which, together with the other arrangements, will be presented in later journals.

FRANK O. HETRICK, President,
Ottawa, Kansas.

HOMER C. BROWN, Rec. Sec.,
185 East State Street,
Columbus, Ohio.

Alumni Association Washington University Dental School.

The Alumni Association of the Washington University Dental School (Missouri Dental College), St. Louis, Mo., has decided to withdraw the annual clinic for 1913 owing to the proximate date of the next session of the National Dental Association at Kansas City, Mo.

R. H. MILLER, D.D.S.,
Chairman Publicity Committee.

New Jersey State Dental Society.

The forty-third annual convention of the New Jersey State Dental Society will be held in the Beach Auditorium at Asbury Park, N. J., July 16, 17 and 18, 1913, beginning on Wednesday, July 16th, at 10 A.M.

The exhibits of modern dental appliances and the latest in office and laboratory equipment will be in charge of Dr. William H. Gelston, 40 North 30th Street, Camden, N. J., who will be glad to furnish information regarding rates and space still available. Early application from those desiring to exhibit with us this year will be greatly appreciated.

The clinics will be in charge of Dr. Henry Fowler, 114 North 4th Street, Harrison, N. J., and will be comprehensive and of a very high order.

Further announcements will be made from time to time.

EDWIN W. HARLAN, D.D.S., Secretary.
47 Crescent Avenue, Jersey City, N. J.

ITEMS OF INTEREST

Arkansas State Dental Association.

The Arkansas State Dental Association instead of having papers and clinics by its own members as heretofore will hold a Post Graduate Course in Little Rock, Arkansas, April 7th to 11th inclusive.

This course will be under the direction of Drs. John P. Buckley, Hart J. Goslee and J. H. Prothero of Chicago. All ethical dentists are eligible and a membership fee will be charged.

For further information address

DR. I. M. STERNBERG, Secretary.

Ft. Smith, Ark.

The Southern California Dental Association.

The sixteenth annual meeting of the Southern California Dental Association will be held at Los Angeles, on May 26, 27, 28 and 29, 1913.

An excellent program of essays and clinics, as well as a large and elaborate exhibit is being arranged. All ethical practitioners of dentistry are cordially invited to be present. Further information will be sent upon request.

JAMES D. McCOY, D.D.S., Chairman Publicity Committee.

708 W. P. Story Bldg., Los Angeles, Cal.

Colorado State Dental Association.

The twenty-seventh annual meeting of the Colorado State Dental Association will be held at Manitou, Colorado, June 19, 20 and 21, 1913. The clinics will be in charge of Dr. A. W. Starbuck, 1340 Arapahoe Street, Denver, Colo., who will furnish any information relative to same. Exhibitors desiring space will please address Dr. F. P. Wells, Exchange National Bank Building, Colorado Springs, Colo. All ethical members of the profession are cordially invited to attend the meeting. Any other information will be cheerfully furnished by the secretary.

H. W. LEFEVRE, President,

206 Metropolitan Bldg., Denver, Colo.

C. A. MONROE, Secretary,

302 Mercantile Bank Bldg., Boulder, Colo.

Northern Ohio Dental Association.

The fifty-sixth annual meeting of the Northern Ohio Dental Association will be held at Cleveland, June 5th, 6th and 7th.

C. D. PECK, Secretary.

Sandusky, O.

Maine Dental Society.

The forty-eighth annual meeting of the Maine Dental Society will be held at the Ottawa House, Cushings Island, Portland Harbor, Maine, June 25, 26 and 27, 1913.

I. E. PENDLETON, Secretary.

Lewiston, Me.

Wisconsin State Board of Dental Examiners.

The Wisconsin State Board of Dental Examiners will convene in Milwaukee, at Marquette University, on June 16, 1913, at 2 P.M., for examination of applicants to practice in Wisconsin.

High school diploma, application and fee of $25 must be filed with the secretary fifteen days prior to above date.

Dental diploma to be presented in advance of examination.

F. A. TATE, President,
Rice Lake, Wis.

W. T. HARDY, Secretary,
422 Jefferson Street,
Milwaukee, Wis.

Texas State Board of Dental Examiners.

The next regular meeting of the Texas State Board of Dental Examiners will be held in the High School Building, Houston, Texas, beginning Monday, June 23, 1913, at 9 A.M. Official application blanks and other necessary information will be furnished applicants by the secretary.

All applications, accompanied by the fee of $25, should be in the hands of the secretary at least five days before the examination. Address all communications to

C. M. MCCAULEY, Secretary.

Abilene, Texas.

North Carolina State Board of Dental Examiners.

The next regular meeting of the North Carolina State Board of Dental Examiners will be held in Winston-Salem, N. C., beginning promptly at nine o'clock on Monday morning, May 26th.

For further necessary information address the secretary.

DR. F. L. HUNT, Secretary.

Asheville, N. C.

The Tennessee State Dental Association.

The Tennessee State Dental Association will hold its annual meeting in Nashville on June 5th, 6th and 7th, with the following officers in the chair:

President, Dr. F. W. Meacham, Chattanooga, Tenn.; 1st vice-president, Dr. W. C. Gillespie, Nashville, Tenn.; 2d vice-president, Dr. J. L. Manire, Memphis, Tenn.; recording secretary, Dr. C. Osborn Rhea, Nashville, Tenn.; treasurer, Dr. W. G. Hutchinson, Nashville, Tenn.; corresponding secretary, Dr. C. E. Hines, Memphis, Tenn.

C. Osborn Rhea, Secretary.

Pennsylvania State Board of Dental Examiners.

The next regular examination of the Pennsylvania State Board of Dental Examiners will be held in Philadelphia and Pittsburgh on Wednesday, Thursday, Friday and Saturday, June 11, 12, 13 and 14, 1913. Application blanks can be secured from the Department of Public Instruction, Harrisburg. Further information can be secured from

Alexander H. Reynolds, Secretary.

4630 Chester Avenue, Philadelphia.

Maryland State Board of Dental Examiners.

The Maryland State Board of Dental Examiners will meet for examination of candidates for certificates, May 29 and 30, 1913, at the Dental Department of the University of Maryland, at 9 A.M.

Candidates must pass a written examination in Anatomy and Physiology, Chemistry and Bacteriology, Oral Surgery, Operative and Prosthetic Dentistry and Pathology, Therapeutics and Materia Medica.

The practical requirements consist of the insertion of one gold and one amalgam filling in the mouth, and the submission of a metal plate or bridge of not less than four crowns—two of which shall be of porcelain—the parts being assembled and invested in advance and soldered in the presence of the board.

Applications accompanied by the fee of ten dollars, must be filed with the secretary prior to May 29th. For application blanks or further information, apply to

F. F. Drew, Secretary.

701 N. Howard Street.